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A RAND NOTE

**Chinese Arms Production and Sales
to the Third World**

Richard A. Bitzinger

RAND

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PREFACE

This Note was prepared for the project "New Realities in the Global Arms Trade," sponsored by the Under Secretary of Defense for Policy. This research was undertaken by the International Security and Defense Strategy Program of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense and the Joint Staff. This Note should be of interest to individuals and organizations concerned with Third World and Chinese arms production and arms sales.

SUMMARY

The Third World has long been a major arms market for Soviet and Western suppliers. In the past 20 years, however, the Third World itself has become a provider, as well as consumer, of weapon systems. Several Third World nations have built up extensive domestic arms industries, and many have aggressively marketed their weapons abroad. Not only are many of these countries able to offer a broad selection of military equipment, from small arms to combat aircraft, but the quality and technology of these systems are often quite high. The easy availability of such higher capability arms has had a major effect upon the regional military balances and security situations in several parts of the Third World, a development that has not escaped the notice of the West.

The People's Republic of China is far and away the largest exporter of military equipment in the Third World. China was a latecomer to the Third World arms bazaar, although it has long possessed a huge indigenous defense industry producing a wide range of weapon systems. Beginning in the late 1970s and accelerating during the 1980s, however, China made up for its late start with a vengeance. By the mid-1980s, in fact, China had become the fourth or fifth largest supplier *overall* of weapons to the Third World, after the Soviet Union, the United States, France, and perhaps the United Kingdom. Moreover, China is one of the developing world's few "full-service" suppliers of military equipment, offering major ground, sea, and air systems for export.

This Note addresses the following issues: What kind of weapons have the Chinese sold abroad, and what effects have these arms sales had on Third World regional security developments? In particular, how do they affect U.S. security interests in the Third World? A good example of U.S. concerns about the possible fallout is China's supplying Iraq with *Silkworm* antishipping missiles, which helped precipitate a major crisis in the Persian Gulf in the late 1980s. In addition, how might future Chinese weapon systems currently under development affect these issues? How concerned should the United States and the West be over Chinese arms modernization, and what Chinese weapon programs should the West track most closely?

The Chinese see arms sales as a means of earning hard currency and gaining access to foreign technology. In both cases, these motivations were primarily driven by the requirement to modernize and overhaul the People's Liberation Army (PLA). The majority of Chinese arms sold abroad are simply copies of old Soviet designs. Many of these Soviet-derived weapons have been extensively modified and even improved upon, however, and the

Chinese are increasingly attempting to develop and build their own indigenous weapon systems. The most critical categories of arms to examine are combat aircraft, main battle tanks, armored personnel carriers, surface-to-air missiles, and antishipping missiles.

Chinese weapons have apparently contributed little serious offensive capability to Third World arsenals in which they can be found, and the effect of these weapons on U.S. options for direct military intervention in regional conflicts is small. In most cases, these arms would be no match for technologically superior U.S. or other Western weapon systems. For example, U.S. countermeasures should easily outwit Chinese antishipping or antiaircraft missiles; Chinese antitank weapons probably could not penetrate U.S. armor. Chinese armaments in the arsenals of potential U.S. adversaries (e.g., Iraq or North Korea) are not usually found in frontline forces. In the Gulf war, Chinese weaponry in the Iraqi armed forces did not distinguish themselves in battle. At best, therefore, these weapons might be said to have a nuisance value.

The transfer of Chinese weaponry to Africa, Asia, or the Middle East generally has not led to any substantial military destabilization of these regions—or at least they have not been as serious a cause as the sale of Soviet, Western, or other Third World arms. For the most part, the kinds of other Third World forces these weapons would conceivably go up against (e.g., Pakistan vs. India, Egypt vs. Israel, Zimbabwe vs. South Africa) are usually superior in firepower and offensive capacity, sometimes vastly so. Chinese equipment in Iran's armed forces was no match for the Soviet or French arms in Iraq's army, for example. In several instances, therefore, Chinese systems have served mainly to boost a Third World country's *defensive* capacities, by improving its ability to patrol and protect its national airspace or territorial waters and to guard its frontiers.

Nevertheless, because of their simplicity, ruggedness, easy availability, and low price, Chinese arms purchases give some very important advantages to Third World countries. Chinese armaments may constitute the "low" in a "high-low" weapons mix. Chinese weapons allow much smaller or poorer Third World countries (the "Fourth World") to possess reasonably large and effective armed forces. Finally, China has become an important source of weapons for some so-called "pariah" nations.

In certain key areas, Chinese arms sales could endanger important U.S. clients in the developing world or even constitute a threat to U.S. strategic interests in various Third World regions. First, China, often with help from Western friends, produces a few very potent weapon systems that could profoundly affect regional military balances. These include the F-7M *Airguard* (a copy of the MiG-21), the *Silkworm* family of antishipping missiles, and various types of ballistic missiles. For example, although it did not constitute

much of a threat to military vessels, Iran's deployment of *Silkworm* missiles nevertheless sent chills down the spine of commercial shipping in the Gulf. The risks stemming from the possible proliferation of Chinese ballistic missile systems or surface-to-surface missile (SSM) technology is self-evident. The transfer of CSS-2 intermediate-range ballistic missiles to Saudi Arabia is a good example of how Chinese arms sales can undermine U.S. political goals in the Third World, while the possible sale of M-9 short-range ballistic missiles to Syria or the M-11 to Pakistan could constitute a serious military challenge as well to U.S. or Western interests in the Third World (e.g., threatening Israel). Second, Chinese arms production and exports could possibly weaken U.S. strategic ties with various friends and allies in the Third World. Thailand has used its weapons purchases from China to lessen its dependence upon the United States for arms, while the CSS-2 missile sale temporarily cooled Saudi-American relations; in addition, Israeli military assistance to China is a potential source of tremendous friction between Tel Aviv and Washington. Finally, the low cost of Chinese equipment permits an attacker the option of using superior numbers to overwhelm a technologically more advanced opponent. For all these reasons, therefore, the potential political/military effect of Chinese weapon systems in the Third World, although small, cannot be totally ignored.

A shrinking Third World market for arms, growing competition from *other* developing countries, and an increasingly demanding clientele have seriously affected recent Chinese arms sales. The People's Republic risks losing many of its traditional and more recent customers if it cannot satisfy their growing demands for weaponry of higher quality and more advanced technology. In addition, it is uncertain whether the Gulf war will lead to a resurgence in arms sales to the Middle East from which the Chinese could profit, or to the imposition of strict weapons export controls, particularly where Iraq is concerned, as many have called for.

The future for Chinese arms sales therefore depends upon China's ability to produce more advanced weapon systems. China is certainly at no loss for highly ambitious new programs, and it currently has several projects at various stages of development with the potential for export. However, probably few of these programs will actually lead to large-scale production efforts, given the powerful domestic impediments to modernization and the limited prospects for securing foreign assistance, particularly foreign technology.

With few new large arms agreements in the offing, Beijing is faced with three possible options. One is to make up for this with lots of small sales, particularly by concluding one-time-only arms deals with countries to which China has not previously sold weapons. Chinese armaments still have the advantage of low price, simplicity, and reliability; and to

its credit, China has had some recent success in expanding its customer base. However, it has always had a very limited clientele, few of whom are among the major Third World buyers of arms; and it has thus far failed to penetrate several potentially lucrative markets, such as Latin America, Northern Africa (aside from Egypt), or, outside of a few customers, the Middle East. Part of the difficulty here is political; many of the countries in these regions are either Soviet or American client states. Others—such as the conservative Arab states, Chile, and rightist regimes in Central America—are traditionally anti-“Red China,” and many in fact still recognize Taiwan as the Republic of China. In addition, the People's Republic has historically had few diplomatic dealings with countries in these regions, so its ties to them tend to be weak. Still others are themselves competitors with China for Third World arms sales. Finally, China's edge in pricing and availability could deteriorate, as the Soviet Union, the former East European communist states, and even the West—who are all flush with excess weaponry and overcapacity in their defense production—could flood the world arms market with high quality secondhand weapons at rock-bottom prices.

China can accelerate its modernization and upgrades programs to stay competitive. Achieving that, however, will be nearly impossible without massive amounts of foreign assistance, both financial and technological, which in the present political atmosphere is difficult to foresee. Yet even if certain foreign collaborative programs do come back on line, they will remain modest compared with China's overall military modernization requirements.

Finally, the Chinese could choose to specialize in future modernization and arms sales. Drawing on traditional strengths in certain areas of domestic military R&D and production—again, mainly combat aircraft, antishipping missiles (AShMs), and SSMs—and making pointed use of foreign assistance in key fields, China could carve out quite a good-sized niche for itself in a few highly lucrative categories of arms (thus underwriting the modernization of the PLA). Perhaps the most important of these is low-end combat aircraft. Over the next decade, several dozens of countries around the Third World will need to start replacing aging MiG-19s, MiG-21s, *Mirage* IIIs, and F-5s. At the same time, neither the Soviet Union nor the West (since the cancellation of the F-20 *Tigershark*) has any program for producing a simple, low-cost, light-combat fighter. The MiG-29 and Su-27 are large, complex aircraft, suited more to current Soviet needs than to those of most Third World countries. The French *Rafale*, the European Fighter Aircraft (EFA), and the Swedish *Gripen* are all too expensive. The British Aerospace *Hawk* 200 is touted as a low-cost fighter jet, but it lacks a true fighter's supersonic speed and maneuverability. Even the F-16 has grown too heavy and too expensive for much of the Third World. The market, therefore, is wide open to a Chinese

fighter option, such as the *Super-7*, should the Chinese be able to get such a program off the ground and running. Furthermore, the Sino-Pakistani K-8 trainer/light attack jet could offer serious competition in Third World markets, and this program should also be closely watched.

China has long been quite strong in the area of antishipping missiles, and Chinese ASHMs offer a cheap, plentiful, and fairly sophisticated option for Third World countries wishing to strengthen coastal defenses and ship-to-ship capabilities; in conjunction, China could expand its sales of missile patrol craft and frigates (armed with the new ASHMs) and retrofit existing naval vessels with more modern antishipping weapons. China could also become a major supplier of ballistic missiles, as well as offer several kinds of key upgrades, subsystems, and technologies for export, and SAM/SSM/ASHM technology transfers. Finally, as is already evident in such endeavors as the Sino-Pakistani K-8 aircraft and China's aid to Iran's ballistic missile program, China could become increasingly active in joint ventures with other Third World countries in developing and producing weaponry.

The emphasis in Chinese arms transfers to the Third World could undergo a dramatic shift, therefore. China may continue to provide low-end military equipment to the Third World, but increasingly its arms exports could be directed toward fulfilling a few niches of "mid-tech" weaponry, if it acted to put the right priorities and resources into those programs with the most potential for foreign sales. In fact, there are some indications that China might indeed be moving in such a direction, given its recent efforts to push its missile products and its attempts to find foreign partners for its aircraft programs (while maintaining a certain level of sales of its more traditional main battle tanks, artillery, ammunition, and patrol craft). If so, then Chinese weapon sales to the Third World, although fewer perhaps, eventually could substantially influence regional military situations.

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GLOSSARY

AAM	Air-to-air missile
AEW	Airborne early warning
APC	Armored personnel carrier
APFSDS-T	Armor-piercing fin-stabilized discarding sabot-tracer
AShM	Antishipping missile
ASW	Antisubmarine warfare
C3	Command, control and communications
CATIC	Chinese National Aero-Technology Import-Export Company
CMEC	China National Machinery and Equipment Import-Export Company
COSTIND	Commission on Science, Technology, and Industry for National Defense
CPMIEC	China Precision Machinery Import-Export Corporation
ECM	Electronic countermeasure
FAC(M)	Fast attack craft (missile)
FAC(T)	Fast attack craft (torpedo)
HUD	Head-up display
HUDWAC	Head-up display weapon-aiming computer
IFF	Identification friend-or-foe
IRBM	Intermediate-range ballistic missile
MBT	Main battle tank
NBC	Nuclear-biological-chemical
NHL	<i>Nouvel Hélicoptère Léger</i>
NORINCO	North China Industries Corporation
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
SAM	Surface-to-air missile
SSM	Surface-to-surface missile
TEL	Transporter-erector-launcher
TSFCS	Tank simplified fire control system

I. INTRODUCTION

The Third World has long been a major arms market for Soviet and Western suppliers. In the past 20 years, however, the Third World itself has become a provider, as well as consumer, of weapon systems. Brazil, Israel, India, Egypt, South Africa, and Singapore have all built up extensive domestic arms industries, and many have aggressively marketed their weapons abroad. Not only are many of these countries able to offer a broad selection of military equipment, from small arms to combat aircraft, but the quality and technology of these systems are often quite high. The easy availability of such higher capability arms has had a major effect upon the regional military balances and security situations in several parts of the Third World, a development that has not escaped the notice of the West.

The objective of RAND's project on "New Realities in the Global Arms Trade" is to examine recent important developments and trends in the manufacture and export of conventional weapons by countries of the Third World. Particular emphasis is placed on indigenous research and development and on the domestic production of arms and weapon systems in the developing world, especially the production of higher technology items. The purpose is also to assess the effects of these trends and developments on U.S. power projection capabilities, on U.S. regional interests, and on regional balances around the world, and to determine what policy options the United States might wish to consider in meeting this potential challenge.

Recent trends and developments in arms production and transfers in this region indicate that the People's Republic of China is especially critical, as it is far and away the largest exporter of military equipment in the Third World. China was a relative latecomer to the Third World arms bazaar, although it has long possessed a huge indigenous defense industry producing a wide range of weapon systems. Beginning in the late 1970s and accelerating during the 1980s, however, China has made up for its late start with a vengeance. Between 1985 and 1989, the People's Republic had exported nearly \$7 billion worth of arms; during that same period, its closest Third World competitor, Brazil, sold only \$1.4 billion worth.¹ By the mid-1980s, in fact, the country had become the fourth or fifth largest supplier *overall* of weapons to the Third World, after the Soviet Union, the United States, France, and perhaps the United Kingdom. Moreover, China is one of the developing world's few "full-service" suppliers of military equipment, offering major ground, sea, and air systems for export.

¹ "Third-world arms industries: Swords not ploughshares," *Economist* March 21, 1991.

Given these general observations, this Note seeks to address the following issues: What kinds of weapons have the Chinese sold abroad, and what effects have these arms sales had on Third World regional security developments? In particular, how do they affect U.S. security interests in the Third World? A good example of U.S. concerns about the possible fallout is China's supplying Iraq with *Silkworm* antishipping missiles (AShMs), which helped precipitate a major crisis in the Persian Gulf in the late 1980s. In addition, how might future Chinese weapon systems currently under development affect these issues? How concerned should the United States and the West be over Chinese arms modernization, and what Chinese weapons programs should the West track most closely?

Section II examines trends and developments in past and present Chinese arms transfers to the Third World and discusses the implications that the availability of these weapon systems have had for Third World military forces. Section III looks at the prospects for Chinese arms modernization with an eye to how these developments might affect future sales. Section IV addresses the effect of recent sales on regional military balances and security environments, and what future Chinese weapon systems, if marketed abroad, might cause the most concern for Western security interests in the Third World.

II. CHINESE ARMS SALES TO THE THIRD WORLD

THE PATTERN OF CHINESE ARMS SALES, PRE-1977

Before 1977, Chinese arms transfers to the Third World were fairly small and had a decidedly ideological tinge to them. Sales tended to be periodic, and the actual quantities of arms sold were quite modest (see Table 1). Major recipients of Chinese weaponry were Pakistan, Tanzania, and North Korea, while China also enjoyed some modest success in supplying various African states such as the Congo, Sierra Leone, Sudan, and Zaire. Nevertheless, China supplied arms to only a handful of Third World countries, usually in very small batches, and the catalogue of offered Chinese weapon systems was quite slim: mainly patrol boats, tanks, fighter jets, artillery pieces, and small arms. Furthermore, the fighting capabilities of many of these weapons, such as their combat aircraft, were unimpressive.

In keeping with its revolutionary ethics, particularly during the Cultural Revolution, China supplied weapons and other equipment to various revolutionary regimes and national liberation fronts, such as North Vietnam and the Khmer Rouge. In its attempts to become a major player in the nonaligned movement and to bolster Third World solidarity against both U.S. and Soviet "imperialism," China provided arms to several African and Asian states during the 1960s and early 1970s. For example, Tanzania, which during this period was one of the chief beneficiaries of Chinese foreign aid (the Chinese-built Tanzania-Zambia railway was at the time the single largest foreign assistance project ever undertaken by the People's Republic), was also a major recipient of Chinese arms. Finally, because of the Sino-Soviet split, China became an important supplier of weaponry to "independent" communist states (as a means of preventing total isolation from the rest of the communist world) and to other Soviet adversaries, such as Albania, North Korea, and Pakistan.

In most cases, the Chinese usually provided the weapons at very low cost or even as free military aid.¹ In fact, the Chinese during this time generally criticized the idea of for-profit foreign arms sales, and Mao Zedong frequently chastized the United States and the Soviet Union for their roles as "merchants of death."²

¹Lec, 1987-88, p. 35.

²"China: Birth of an Arms Salesman," *Economist*, November 17, 1984.

Table 1
Major Chinese Arms Exports: 1970s

Country	Type of Export	Quantity
Albania	J-7 fighter	25
Bangladesh	Type-62 light tank	40
	J-6 fighter	36
Cameroon	<i>Shanghai</i> -class patrol boat	2
Congo	Type-59 MBT	15
	Type-62 light tank	14
Egypt	J-6 fighter	60
Guinea	<i>Shanghai</i> -class patrol boat	4
Kampuchea (Khmer Rouge)	Type-59 MBT	NA
	HJ-73 ATGW	200+
	J-5 fighter	4
	J-6 fighter	16
North Korea	Type-59 MBT	175
	Type-531 APC	NA
	Type-59 arty	NA
	J-5 fighter	200
	J-6 fighter	200
Pakistan	Type-59 MBT	200+
	J-6 fighter	150+
	<i>Huanchen</i> -class FAC(T)	4
	<i>Shanghai</i> -class patrol boat	12
	<i>Hainan</i> -class patrol boat	5
Sierra Leone	<i>Shanghai</i> -class patrol boat	2
Sudan	Type-62 light tank	70
	J-5 fighter	15
Tanzania	Type-59 MBT	30
	Type-62 light tank	30
	Type-56 APC	30
	Type-54/-56/-59 arty	150
	J-4/-5 fighter	12
	J-6 fighter	12
	J-7 fighter	12
	<i>Huanchen</i> -class FAC(T)	4
	<i>Shanghai</i> -class patrol boat	6
Tunisia	<i>Shanghai</i> -class patrol boat	2
Zaire	T-62 light tank	50
	Type-56/-59/-60/-63 arty	80
	<i>Huanchen</i> -class FAC(T)	4
Zambia	T-59 MBT	20
	J-6 fighter	12

SOURCE: SIPRI Yearbooks, various years.

THE PATTERN OF CHINESE ARMS SALES, 1977-PRESENT

The "modern" period in Chinese arms sales began around 1977. It can be directly linked to the stabilization of Chinese internal politics under Deng Xiaoping and his launching of an ambitious modernization program for the country. The demise of the last vestiges of the Cultural Revolution and the pronouncement of Deng's "four modernizations," particularly that affecting the People's Liberation Army (PLA), opened the way for major changes in Chinese arms export policies, greatly increasing not only the number of countries to whom China sold arms but also the quantity and variety of the arms sales themselves.

Chinese motivations behind arms transfers to the Third World have altered dramatically since the late 1970s. Increasingly, the Chinese have seen arms sales as a means of earning hard currency and gaining access to foreign technology. In both cases, these motivations were primarily driven by the requirement to modernize and overhaul the PLA. The PLA is currently being buffeted in two directions: the "need" to guarantee China's status as a world power, which it defines largely by military capability, and a declining defense budget and growing military-technological gap. According to a U.S. China expert, Chinese strategists "unequivocally view the modernization of military power as essential for China's credibility as a world power in the next century."³ At the same time, China's armed forces are confronted by declining resources and a backward or hidebound military R&D system incapable of generating or exploiting technological innovation. Overseas arms sales were an important means of funding or otherwise aiding that modernization.⁴

This expansion in Chinese arms sales in the past decade can be seen in Table 2. During 1982-89, China rose to become the fifth largest supplier of weapons to the Third World, with deliveries totaling over \$13 billion; if one counted only arms transfer agreements for the latter half of this period (1986-89), China actually ranked third.⁵ Deliveries of Chinese weapon systems grew 37 percent from the period 1982-85 to the period 1986-89, while arms transfer agreements from China to the Third World increased by more than 137 percent. The character of Chinese arms exports also began to change after 1977. Previous major purchasers of Chinese arms, particularly such African states as Zambia and Zaire, dropped off, while Beijing picked up several new important customers elsewhere in the Third World, such as Bangladesh, Egypt, Iran, Iraq, Thailand, and Zimbabwe (Pakistan, a

³Pollack, 1991, p. 31.

⁴Pollack, 1991, pp. 29-37.

⁵In comparison, the Soviet Union during this period ranked first, with sales totaling \$133 billion; the United States second, \$50 billion; France third, \$26.5 billion; and the United Kingdom fourth, \$14 billion (Grimmett, 1990, pp. 32, 45, 56).

Table 2
Major Chinese Arms Exports: 1980-1991

Country	Export	Quantity
Bangladesh	Type-59 MBT	36
	J-7 fighter	16
	Q-5 attack plane	16
	<i>Jianghu</i> -class frigate	2
	<i>Hegu</i> -class FAC(M)	4
	<i>Huangfen</i> -class FAC(M)	4
	<i>Huanchen</i> -class FAC(T)	4
	<i>Hainan</i> -class patrol boat	2
	<i>Shanghai</i> -class patrol boat	8
	HY-2/FL-1 antishipping missile	24
Burma	J-6 fighter	20-24
	J-7 fighter	10-12
	<i>Shanghai</i> - or <i>Hainan</i> -class patrol boat	4? (negotiating)
Congo	<i>Shanghai</i> -class patrol boat	3
Egypt	J-6 fighter	40
	J-7 fighter	80
	Type-033 SSK	4
	<i>Jianghu</i> -class frigate	2
	<i>Hegu</i> -class FAC(M)	6
	<i>Hainan</i> -class patrol boat	8
	<i>Shanghai</i> -class patrol boat	4+
	HY-2/FL-1 antishipping missile	72
Indonesia	<i>Jianghu</i> -class (?) frigate	negotiating
Iran	Type-59 MBT	250
	Type-501 APC	300
	Type-59 arty	100
	Type-62 arty	100
	HN-5 SAM	500+
	HQ-2J SAM	50
	HJ-73 ATGW	6500
	J-6 fighter	75+
	J-7 fighter	60
	<i>Chaho</i> -class patrol boat	3
	HY-2/FL-1 antishipping missile	72+
	C-801 antishipping missile	100
Iraq	Type-59 MBT	1000
	Type-69 MBT	600
	Type-531 APC	650
	Type-59 arty	720
	J-6 fighter	50
	J-7 fighter	90
	H-6 bomber	4
	C-601 antishipping missile	300
North Korea	J-7 fighter	40
	Q-5 attack plane	40
Pakistan	Type-69 MBT	licensed production
	Type-59 MBT	1000+
	HQ-2J SAM	75

Table 2—continued

Country	Export	Quantity
	J-7 fighter	150
	Q-5 attack plane	150
	HN-5 SAM	200+
	Han-class SSN	1
	Hegu-class FAC(M)	4
	Huangfen-class FAC(M)	4
	Hainen-class patrol boat	4
	Barakat-class patrol boat	2+
	HY-2/FL-1 antishipping missile	24
Saudi Arabia	CSS-2 IRBM	12+
Somalia	J-6 fighter	30
Sri Lanka	Y-12 transport plane	10
	J-5 fighter	2
	J-7 fighter	4
Sudan	J-6 fighter	12
Syria	M-9 SRBM	negotiating
Thailand	Type-69 MBT	72
	Type-531 APCs	1100+
	Type-59 arty	18
	Type-82 MRL	NA
	HQ-2J SAM	12 possible
	J-7 fighter	24 possible
	Type-033 SSK	negotiating
	Jianghu-class frigate	6
	C-801 antishipping missile	50+
Zimbabwe	Type-59 MBT	35
	Type-531 APC	10
	Type-54/-60/-63 arty	25+
	J-7 fighter	48

SOURCE: SIPRI Yearbooks, various years.

major buyer of Chinese weapons even before 1977, remained a steady client and actually increased its business with China over the new phase). Burma appears to have become China's newest customer, signing a \$1 billion deal with Beijing in September 1990 for fighter aircraft, four patrol boats, ground-based radars, antiaircraft guns, and assorted small arms and ammunition.⁶ Moreover, during this period, China began exporting types of arms that it had previously not sold abroad, such as SAMs, AShMs, bombers and attack aircraft, large surface vessels, submarines, and even ballistic missiles. In many instances, this equipment simply came out of surplus PLA stocks "lying unused in army warehouses."⁷

China's greatest success during the 1980s was breaking into the lucrative Middle East and South Asian arms market, when over 80 percent of China's arms sales were to this

⁶Burma buys Chinese arms," *Jane's Defence Weekly*, September 15, 1990.

⁷Pollack, 1991, p. 36.

region. In particular, the Iran-Iraq war made Tehran and Baghdad two of China's largest recipients during the 1980s. These two countries accounted for 57 percent of all Chinese arms sales during this period. From 1982-89, China supplied 22 percent of Iran's armaments; in 1989, China became Tehran's single biggest arms supplier. During this same eight-year period, 9 percent of Iraq's weaponry came from China; however, the *value* of Chinese arms supplied to Iraq was actually greater than that delivered to Iran (\$4.2 billion versus \$3.3 billion), and this overall percentage was smaller only because Iraq outspent Iran on weapons by nearly 3:1.⁸

China used some very surreptitious routes to supply arms to Iran and Iraq. Iran, for example, received fighter aircraft and other Chinese weapons via North Korea. In Iraq's case, in the early 1980s, Egypt and Jordan assembled aircraft kits provided by the Chinese and then transferred these arms to Iraq. This fiction permitted the Chinese to deny that it had personally delivered such weapons to either side.

Chinese sales to Thailand (and perhaps to Burma as well) have constituted an interesting exception to the current rule of weapons for cash. Beijing's rationale for reaching out to the Thais was grounded more in regional geopolitical interests. Both have a common adversary (Vietnam) and an interest in restricting Soviet-backed activities in the region. Hence, China has been willing to sell weapons to Thailand at rock-bottom or "friendship" prices. The Thais have been able to buy Type-69 main battle tanks (MBTs) for \$300,000—about one-fifth the estimated cost of a comparable T-54/-55 tank—and armored personnel carriers (APCs) for \$100,000. The Chinese have also offered to set up a joint venture for the Thai production of Chinese APCs.⁹

MAJOR TYPES OF WEAPONS EXPORTED

The majority of Chinese arms sold abroad are simply copies of old Soviet designs, most dating from the 1950s or early 1960s. Many of these Soviet-derived weapons have been extensively modified and even improved upon, however, and increasingly the Chinese are attempting to develop and build their own indigenous weapon systems. The most critical categories of arms are main battle tanks, APCs, SAMs, combat aircraft, and ASHMs.

Main Battle Tanks

China has exported two classes of MBT, the Type-59 and the Type-69. The Type-59 is a Chinese-built version of the Soviet T-54 tank. It is usually equipped with a 100 mm gun,

⁸Grimmett, 1990, pp. 33, 36, 57-58.

⁹"Thais turning to Chinese arms," *Jane's Defence Weekly*, January 7, 1989.

although later models (known as the Type-59II) come with a 105 mm rifled gun. During the 1950s, 1960s, and even 1970s, the Type-59 was the PLA ground forces' workhorse MBT, and thousands were built until production ceased sometime in the mid-1980s. This tank has also been exported extensively; since the late 1970s it has been sold to Bangladesh, Iran, Iraq, North Korea, Pakistan, and Zimbabwe. In October 1990 it was revealed that Beijing had delivered 24 Chinese MBTs, believed to be Type-59s, to the Khmer Rouge via Thailand.¹⁰

The Type-69, which began production in the early 1980s, is a virtual copy of the Type-59, with modifications mainly to the armament, fire-control, and night-vision equipment. The Type-69I carries a 100 mm smoothbore gun, a Chinese-developed laser rangefinder, an infrared system for night operations, and a full nuclear-biological-chemical (NBC) protection system. The Type-69II MBT is fitted with a 100 mm rifled gun (the Chinese apparently suffered declining accuracy with the smoothbore gun and returned to the more tried-and-true rifled barrel), side skirts, and a Tank Simplified Fire Control System (TSFCS) consisting of a laser rangefinder, a ballistic fire-control computer, and a new tank gun sight.¹¹ Both models of the Type-69 have been exported to Iraq and Thailand, and Pakistan has been granted a license to produce the tank domestically.

Armored Personnel Carriers

The Type-531 (also known as the Type-85) is actually a family of Chinese APCs derived from the Soviet BMP-1. It is a tracked, amphibious vehicle capable of carrying up to 13 soldiers. It is usually armed with a machine gun but can be outfitted with a variety of mortars, rocket launchers, or antitank guided weapons. The Type-531 can also serve as an armored command post or battlefield ambulance. It has been sold to Iraq, North Korea, Tanzania, Thailand, and Zimbabwe.

Surface-To-Air Missiles

China's main surface-to-air missile is the HQ-2 (Western designation: CSA-1), a derivative of the Soviet SA-2 *Guideline*, first fielded in the late 1950s. The HQ-2/SA-2 is a low-to-high altitude SAM system, with a maximum range of approximately 35 kilometers. The system comes in both semifixed (HQ-2J) and mobile variants (HQ-2B) and is used in conjunction with the "Gin Sling" all-weather target acquisition and tracking/missile guidance radar. The HQ-2 differs from the SA-2 (which the Soviets themselves are phasing out of their arsenal) in that it has been upgraded with new electronics and an improved warhead

¹⁰ "China sends tanks to Khmer Rouge," *Jane's Defence Weekly*, October 13, 1990.

¹¹ *Jane's Armour and Artillery*, 1988-89, 1988, pp. 7-9.

and has both head-on and tail-chase engagement capabilities. The semifixed HQ-2J system has been sold to Iran and Pakistan. North Korea has purchased this missile as well as the technology for the system to maintain its own stocks of HQ-2s and Soviet-supplied SA-2s. Thailand is also considering the acquisition of this missile system.

The HN-5 SAM is a short-range antiaircraft system based on the SA-7 *Grail*. Like that of the HQ-2, the original design for the HN-5 dates back to the late 1950s. The HN-5 is a shoulder-fired, manportable SAM with a range of only a few miles and is intended for point air defense for small ground units. The HN-5 has been supplied to Iran and Pakistan and, during the 1980s, to the Nicaraguan *contras*. The Chinese have recently unveiled a truck-mounted, eight-round version of the HN-5 that has been offered for export, but it has not yet been sold abroad.

China is also assisting Egypt in upgrading its missile production facilities, including helping it develop an improved version of its domestically manufactured SA-7 SAM, which it calls the *'Ayn al-Saqr*. Egypt, in turn, has exported many of its missile systems to other Arab and African states.¹²

Combat Aircraft

The first Chinese-built fighter jet, the J-5 (whose export version was known as the F-5), was a licensed production of the MiG-17F, a Soviet day-fighter developed in the early 1950s. Since the 1960s, the workhorse of the PLA Air Force (PLAAF) has been the J-6 (export designation: F-6), itself a licensed-built version of the MiG-19. The J-6/MiG-19 is a 1950s-era, swept-wing supersonic combat fighter. During the 1960s and 1970s, China built several thousand J-6 aircraft, and, although obsolete, over 3,000 remain operational in the PLAAF (out of a total combat aircraft inventory of around 5,000 combat aircraft).

Even during the 1980s, China continued to export the J-6, often taking aircraft out of PLAAF stocks or surplus. Major buyers of this aircraft were Egypt, Iran, Iraq, North Korea, Pakistan, Somalia, Tanzania, and Zambia. China is no longer producing or exporting the J-6.¹³

The J-7 (F-7) was developed from the venerable MiG-21 *Fishbed* and is currently China's principal combat aircraft for export. Various versions of the J-7 have been produced and sold abroad since the 1970s. The J-7 is armed with an internal cannon and can carry a variety of short-range, infrared-guided (heat-seeking) air-to-air missiles (AAMs), such as the AA-2 *Atoll*, the PL-2 (a Chinese copy of the *Atoll*), and the AIM-9 *Sidewinder*. The F-7A and

¹²Darwish, 1990.

¹³Pakistan, however, has resold some its J-6s to Bangladesh.

F-7B were export designations of the earliest J-7 model, and these were sold to Albania, Egypt, Iraq, and Tanzania. (In an interesting barter arrangement, Egypt and Iraq supposedly traded one or two of their MiG-23s—a more advanced combat aircraft than currently exists in the Chinese arsenal—and other weapons¹⁴ in exchange for the Chinese aircraft. The Chinese have reportedly attempted to “reverse-engineer” the MiG-23 or incorporate its technology in Chinese aircraft.)

A much improved version of the J-7, built specifically for export, was the F-7M *Airguard*. The *Airguard* has a more powerful engine and upgraded avionics (provided by GEC Avionics of Britain), including improved ranging radar, a head-up display weapon-aiming computer (HUDWAC), an identification friend-or-foe (IFF) system, an air-data computer, a radar altimeter, and other improvements to the basic airframe. The F-7M has been sold to Pakistan, Bangladesh, Iran, and Zimbabwe. Thailand, Burma, and Sri Lanka are also buying this aircraft. A further modification of the F-7M, the F-7P *Skybolt*, was delivered to the Pakistanis in 1989; its basic improvement over the *Airguard* was the addition of a Martin-Baker ejection seat and the capacity to carry four AAMs, rather than only two for the F-7M. These avionics and other equipment are *not* found in similar J-7 fighters (for example, the J-7II and J-7III) in the PLAAF.

The Chinese also export a dedicated ground-attack aircraft called the Q-5, derived from the J-6. It is essentially a MiG-19, but with two lateral air intakes and a solid nose replacing the old through-fuselage air intake, allowing room for the installation of various navigational aids and weapon-delivery systems. Initial models also possessed an internal bomb bay, although that was later replaced by additional fuel tanks. The Q-5 carries two internal guns and has ten hardpoints for a variety of munitions, including general purpose bombs, air-to-surface rockets, AAMs for self-defense, and even the C-801 AShM (see below). In the PLAAF, the aircraft can also carry a 20-kiloton nuclear bomb. China has sold the basic Q-5 to North Korea. A modified export version of the Q-5, known as the A-5C, comes equipped with improved avionics, a Martin-Baker ejection seat, and provisions for Western armaments. This aircraft has been supplied to Pakistan and Bangladesh.

The Chinese have also sold a handful of H-6 bombers to the Third World. The H-6 (export designation: B-6) is a Chinese-manufactured version of the Tu-16 *Badger* strategic bomber. The H-6 was originally designed for nuclear strike duties; however, later versions

¹⁴China supposedly received T-62 tanks, surface-to-air missiles, and antitank guided weapons from Egypt, and Exocet missiles from Iraq (Lee, 1987–88, p. 39; Tuomi and Vayrynen, 1982, p. 115).

have been modified for reconnaissance or maritime attack. Four such H-6 bombers, together with the C-601 air-to-surface antishipping missile, were sold to Iraq in the late 1980s.

Antishipping Missiles

Because of the publicity they received in the West during the Iran-Iraq War, a great deal of attention has been focused on the exports of Chinese ASHMs. The largest family of Chinese ASHMs is derived from the Soviet SS-N-2 *Styx*. Chinese versions of the *Styx* have been deployed in several modes: coastal (the infamous HY-2 *Silkworm*, fired from mobile launchers), ship-launched (FL-1), and air-launched (C-601). The basic Chinese *Styx* utilizes active radar homing, solid-fuel boosters, and a liquid-fuel rocket engine. Improvements on the design include a sea-skimming capability and infrared seeker, and the addition of an air-breathing turbojet, but only the basic version appears to have been sold abroad. The HY-2 has been supplied to Iran; the FL-1 to Bangladesh, Egypt, and Pakistan (mainly deployed on *Jianghu*-class frigates and *Huangfeng*- and *Hegu*-class missile-carrying fast attack craft or FAC(M)s; and the C-601 to Iraq (for its H-6 bombers).

Another class of ASHM is the C-801. The C-801 is very similar in design and function to the French-built Exocet, prompting speculation that the missile is a "bootleg," reversed-engineered copy of the Exocet, probably obtained from Egypt or Iraq.¹⁵ This ASHM features a fully active radar seeker, a solid-fuel engine, and a sea-skimming capability, and it is capable of sinking a destroyer-class vessel. So far, the only confirmed overseas sales of the C-801 have been to Thailand, which will use the missile to equip the six *Jianghu*-class frigates it is also buying from China.¹⁶ In addition, there are unofficial reports that Iran has also purchased this missile.¹⁷

Other Weapons, Military Systems, and Weapons Technology

China has also exported light tanks, artillery guns, rocket launchers, mortars, small arms, and ammunition to several African and Asian countries. It has supplied Iran with its HJ-73 antitank guided weapon, a copy of the Soviet AT-3 *Sagger*, a first-generation precision-guided munition. Bangladesh, Egypt, Iran, Pakistan, and Thailand have become major customers for Chinese-built naval vessels, ranging from *Shanghai*-class patrol boats to *Jianghu*-class frigates; even Indonesia (which recently reestablished diplomatic relations with the People's Republic after a 23-year hiatus) is negotiating with China for an unknown

¹⁵Lee, 1987-88, p. 39.

¹⁶Karniol, 1990b.

¹⁷"U.S. Notes 'Strong Indications' China is sending more missiles to Tehran," *Washington Post*, December 25, 1987.

number of frigates.¹⁸ Beijing has sold four Type-033 (ex-Soviet *Romeo*-class) submarines to Egypt and is negotiating with Thailand for a similar sale. Zimbabwe is supposedly purchasing an entire air-defense system from the Chinese, including radar arrays and a complete command, control, and communications (C³) network, manned by Chinese personnel until enough Zimbabweans are trained to run it.¹⁹

China has also begun to deal in more unusual or unconventional arms. It recently entered the growing Third World SSM market, and in 1988, in a highly controversial sale, China transferred between 12 and 60 *Dong Feng 3* (CSS-2) intermediate-range ballistic missiles (IRBMs) to Saudi Arabia. In fall 1990, it also agreed to sell Pakistan a nuclear-powered *Han*-class submarine, to counter India's leasing of a *Charlie*-class nuclear attack submarine from the Soviet Union.²⁰

China also exported innocuous-sounding materials that can have important military applications. It has sold lithium hydride to Libya and Iraq (the latter in violation of the U.N. embargo on sales to Iraq in response to its invasion of Kuwait),²¹ a chemical that can be used in manufacturing nerve agents, missile fuel, and even nuclear weapons. Less visible but just as significant, China is slowly becoming an exporter of military technology. Admittedly, most Chinese technology is much less advanced than that of the West or even the Soviet Union, but in certain niches Beijing has been able to establish a small but lucrative market. One of these is nuclear weapons technology. China is allegedly aiding Algeria in developing a nuclear weapons program, including building a nuclear reactor in Algeria for producing plutonium. China is also supposedly providing "military advice on how to match nuclear weapons to various aerial and missile delivery systems."²² It has supplied Iraq and Pakistan with sophisticated magnets that are used in high-speed centrifuges employed in the production of weapons-grade uranium.²³ Another critical technology is for surface-to-surface missiles. China, for example, is assisting Egypt in upgrading its domestic missile production facilities, aiding the Egyptians in improving their indigenously built SCUD-B SSM as well as their Soviet-model SAMs, and it is supposedly also helping them license-produce *Silkworm* AShMs. Beijing has granted Iran a license to produce Chinese versions of the FROG and

¹⁸Karniol, 1990a.

¹⁹"Zimbabwe Opting for National AD Radar Net," *Defense and Foreign Affairs Weekly*, February 19-25, 1990.

²⁰Tai, 1990b.

²¹"China: Who, us?" *Economist*, October 6, 1990.

²²Mann, 1991; also Gertz, 1991; and Nelan, 1991.

²³Gertz, 1990; Dorsey, 1989.

SCUD-B Soviet SSMs. It has also helped Pakistan develop its short-range *Hatf I* and medium-range *Hatf II* SSMs.²⁴

China has also helped to establish facilities in Pakistan to repair and overhaul J-6 and Q-5 aircraft (a J-7 facility will be added in the early 1990s), and to manufacture a Pakistani version of the Type-69 tank to be called the *Khalid*. Meanwhile, in addition to the aforementioned offer to establish a Thai production line for the manufacture of Chinese APCs, Beijing has proposed a joint venture to repair Chinese tanks in the Royal Thai Army.²⁵

THE EFFECTS OF CHINESE ARMS IN THE THIRD WORLD

Despite the proliferation of Chinese arms in the Third World, the actual military utility of these weapons is debatable. Nearly every Chinese weapon system sold abroad is a clone of a Soviet design more than 30 years old. Ironically, most of the arms in China's sales catalogue can hardly be found in Soviet inventories. Even granting substantial Chinese modification of and upgrading of these weapons, many of them are at a minimum two or three generations behind current Western or Soviet systems. China's main class of submarine, the Type-033, is based on an obsolete Soviet design. Chinese MBTs lack large caliber, smoothbore cannons, thermal jackets, and reactive armor. Their SAMs are very susceptible to most modern electronic countermeasures (ECM). Chinese combat aircraft mostly lack sophisticated avionics, such as HUDs and ECM suites. Chinese interceptors, such as the J-7, still do not possess an adequate air interdiction radar, or the ability to fire radar-guided AAMs. Both the J-6 and Q-5 aircraft, in fact, have hardly any airborne electronic systems at all, although the Q-5's solid nose was developed expressly for the purpose of installing additional avionics. If anything, the technological gap between the Chinese and the Soviets/West has *widened*, rather than narrowed.

Much of this equipment is also of poor quality, perhaps even worse than the Soviet models upon which they are based. The Chinese have long had a poor record in quality control. Indeed, they have frequently consciously emphasized quantity over quality, often with disastrous results. Early production models of the J-6 aircraft, launched during the "Great Leap Forward" in the late 1950s, were so inferior that the PLA refused to accept them.²⁶ Contrary to pronouncements by Chinese officials of a new emphasis on "quality first," the workmanship of Chinese products does not appear to have improved considerably

²⁴Perera, 1989, p. 103; "World Weapons Sales Top \$1 Trillion, Paced by South Asia Market," *Aviation Week & Space Technology*, August 28, 1989, p. 36; "Official: China aids Iran with factory," *Defense News*, March 15, 1989.

²⁵Frost, 1989; "Pakistan reaches MBT 'Milestone'"; "Thailand to Set Up Joint Venture to Repair Chinese Battle Tanks," *International Defense Intelligence*, May 8, 1989.

²⁶*China Today: Aviation Industry*, 1989, p. 115.

since. A Western military journalist visiting Thailand revealed that Type-69 tanks in the country's army inventory sported crude welding, suspect steel quality, and a smokey, oil-gushing engine; more critically, the MBT's fire-control system and gun are not stabilized, while the turret drive causes the gun to wander, greatly degrading accuracy.²⁷

Representatives of *Aviation Week & Space Technology* touring the Chengdu Aircraft Corporation wrote of "rough lap joints," "sloppy cockpit transparency sealing," "uneven panel joints," and "occasional coarse rivet finishing" in various J-7 models.²⁸

The combat effectiveness of many Chinese arms is doubtful, therefore. The Q-5, for example, is very limited in its ability to find and strike ground targets; because it lacks modern sensors, it would have to first visually identify and locate a target and then dive bomb from a medium altitude on a second pass, leaving it vulnerable to identification and attack from enemy air defenses.²⁹ Chinese weapons would be no match for most Western or Soviet equipment. A Type-69 MBT, even with its improved fire-control system, would have little effectiveness up against a T-72, T-80, or M-1 tank (or even a T-64 or M-60). A J-6 would be flying cannon fodder against most other combat aircraft. For these reasons, for example, the Iranians during their war with Iraq reportedly kept most of their Chinese weaponry away from the front, instead deploying it around Tehran to defend the capital.³⁰ The Iraqis also do not appear to employ Chinese equipment in their frontline forces.

Nevertheless, there have been some very important advantages to Third World countries in purchasing Chinese arms. These weapons are usually rugged, simple to operate and maintain, and fairly reliable, important attributes in countries where the technological expertise or maintenance capabilities may not be high or uniform. China offers an attractive alternative source of armaments to a country wishing to reducing its dependence (and hence the potential for leverage against it) upon Western or Soviet suppliers. This motive was apparent in Thailand's recent purchases of Chinese equipment, for example; the Thais have long been concerned about their overreliance upon the United States for the bulk of their weaponry, and, quality issues aside, Chinese arms are a good hedge against potential arms cutoffs or supply problems. Most Chinese weapon systems are also compatible with Soviet equipment, making them additionally appealing to Third World countries that already have considerable amounts of Soviet equipment in their inventories.

²⁷See Slade, 1990.

²⁸Fink and Proctor, 1989, p. 83.

²⁹Sweetman, 1984, p. 78.

³⁰Weisskopf, 1984.

There are also important exceptions to the rule as to the low quality of Chinese arms. One of these is the F-7M export version of the J-7. The F-7M has been substantially upgraded with the addition of Western avionics and is at least as good as or perhaps even better than most Soviet-built MiG-21s found in Third World inventories, which usually lack HUDs and other sophisticated electronics; the Type-531 Chinese APC was found to have very good workmanship.³¹ Another important exception are China's SSMs and ASHMs, which are reasonably modern.

Above all, Chinese weapon systems are cheap and readily available, with few questions asked. One can buy a lot of Chinese arms for the price of just one comparable Western or Soviet weapon. For the cost of one F-16 (approximately \$15 million), for example, a Third World country can buy five J-7s (approximately \$3 million each). Spare parts and technical assistance are also easily obtainable. In addition, in keeping with Beijing's policy of noninterference in other countries' internal affairs, Chinese arms come with few strings attached. China has shown few qualms about selling to almost anyone with the necessary hard currency: witness its willingness to sell to both sides in the Iran-Iraq War. It was reported that China has also attempted to smuggle weapons to Iraq after the UN-imposed embargo via a third country, probably North Korea or Iran.³² In addition, it is often ready to work out "alternative" purchasing arrangements, such as barter or technology transfers.

In light of these drawbacks and benefits, one tends to see Chinese arms benefitting its Third World customers in one of three ways. For one, Chinese armaments constitute the "low" in a "high-low" weapons mix. A Third World country may wish to (or may only be able to) buy a few sophisticated Western or Soviet weapon systems, such as tanks or combat aircraft, and then also purchase a large amount of cheap, "low-tech," but perfectly serviceable Chinese arms to "fill out" its forces. Egypt, Pakistan, and, to a lesser extent, Iraq and Thailand are prime examples of this approach. For instance, Pakistan bought 46 F-16s from the United States and around 80 *Mirage* III/Vs from France, but it has also purchased over 300 J-6, J-7, and Q-5 aircraft from China. Egypt possesses around 140 F-16s and *Mirage* 2000s but has supplemented these with a roughly equal number of Chinese fighters. During the 1980s, Iraq bought 500 frontline T-72 MBTs and several hundred armored fighting vehicles from the Soviet Union, but it also purchased 1,500 Chinese MBTs and 1,000 Type-531 APCs during that same period. Sometimes this equipment may be placed in reserve or

³¹Slade, 1990.

³²Tyson, 1991; "China: Who, us?" *Economist* October 6, 1990.

rear echelon forces. Either way, the availability of Chinese arms has permitted several Third World countries to build up good-sized armed forces for a quite low cost.

Chinese weapons allow much smaller or poorer Third World countries (the so-called "Fourth World") to possess reasonably large and effective armed forces. Countries falling under this category include Somalia, Sudan, and particularly Bangladesh and Zimbabwe. In the case of the latter two, the factor of China as a source of cheap arms has permitted both to greatly expand the size of their forces. Zimbabwe has supplemented its air force of 16 Hunter and Hawk aircraft with 48 J-7s; it has also purchased tanks, APCs, artillery pieces, and other assorted equipment from China. As previously mentioned, Zimbabwe is procuring a complete air defense network from China as well. Meanwhile, Bangladesh, with the aid of Chinese weapon systems, has more than quadrupled the size of its air force and greatly expanded its navy.

Finally, China has become an important source of weapons for some so-called "pariah" nations, such as Iran, Libya, North Korea, and now Iraq.³³ During the 1980s, Khomeini's Iran, in part because of the U.S. embargo and in part because it had little money to buy Western or Soviet weaponry, became a major consumer of Chinese arms. These weapons, especially such controversial ones as the *Silkworm* ASHM, were an important factor in keeping Iran in the ballgame in its war with Iraq and in salvaging some of its credibility as a regional power to be reckoned with. China may not be the sole potential source for particular weapons or military-use equipment—such as strategic chemicals for Libya or nuclear weapons-related materials for Iraq and Pakistan—but it is often the only one willing to sell to these countries. In all, countries that have overwhelmingly come to rely upon Chinese arms are Bangladesh, Iran, Tanzania, and Zimbabwe (along with the Cambodian Khmer Rouge), while Egypt, Iraq, Pakistan, and Thailand greatly depend upon Chinese weapons to supplement their arsenals.

DEATH OF A (CHINESE ARMS) SALESMAN?

During the past decade or so, China has experienced considerable success in expanding its arms exports to the Third World. If it did not exactly become a major player in the world arms trade, it certainly appeared to be an up-and-coming second-tier supplier, offering certain advantages (low cost, ready availability) and filling certain niches (for light combat aircraft or for antishipping missiles). Lately, however, China's future as an arms

³³In addition, although not technically a Third World nation, Ceausescu's Romania (which could arguably be classified as a pariah nation) was also a major purchaser of Chinese arms, mainly naval vessels, and Romania possesses 26 *Huchuan*-class torpedo boats, four "P-4"-class patrol boats, and more than 30 *Shanghai*-class inshore patrol boats (*The Military Balance*, 1990-91, 1990).

exporter has become cloudy. After peaking at nearly \$5 billion in 1987, Chinese arms transfer agreements dropped to \$2.4 billion in 1988 and to \$1.1 billion in 1989. China's share of the world market tumbled from 11.5 percent in 1987 to just under 4 percent in 1989.

The 1988 ceasefire agreement between Iran and Iraq has particularly affected the demand for Chinese weaponry, as these two countries were Beijing's biggest arms customers during the 1980s. Now, with the ending of that war, future large sales to these countries are increasingly in doubt.³⁴ In a larger sense, Chinese arms sales are simply the victim of a general winding down of several regional conflicts—in Afghanistan, Cambodia, and Nicaragua—and the subsequent slowdown in Third World defense spending and arms purchases that came at the end of 1980s. Third World military expenditures actually began falling in the mid-1980s, with defense spending in the Middle East witnessing the most dramatic declines. Total worldwide arms transfer agreements with the Third World fell from \$61.4 billion in 1982 to \$39.8 billion in 1988, and to \$29.3 billion in 1989.³⁵ Furthermore, it is unclear still whether the recent war against Iraq will mean a new rise in Middle East arms purchases or whether in fact will lead to stricter controls on the export of weapons to this volatile region.

In conjunction with a shrinking Third World market for arms, China has had to cope with growing competition from *other* developing countries that produce arms for export and with an increasingly demanding clientele. Especially Brazil, but also Singapore, Israel, South Korea, Yugoslavia, and others offer increasing competition in the field of low- and mid-technology weapon systems for the Third World. Brazil, moreover, is just as prepared as China to sell arms to just about anyone.³⁶

Future Chinese arms sales are further endangered by growing demands on the part of the Third World for more sophisticated weapons.³⁷ The weapon systems China currently exports are fast becoming obsolescent and in need of replacement or serious upgrading. Beijing has just about saturated its arms niche, particularly among its traditional list of recipients, many of whom have increasingly demanded more quality and higher levels of technology in the next generation of arms they plan to purchase. One need only to look at the weapons that several of these countries have lately tried to buy. Iran, for example, has recently signed a \$6 billion assistance package with the Soviet Union that includes purchase

³⁴Silverberg, 1989.

³⁵Grimmett, 1990, pp. 40, 41; "Third World spending less on arms," *Jane's Defence Weekly*, February 25, 1989. All figures given in constant 1989 U.S. dollars.

³⁶*World Military Expenditures and Arms Transfers*, 1987, p. 22.

³⁷"Third-world arms industries: Swords not ploughshares," *Economist*, March 23, 1991.

of at least 14 MiG-29 fighters, and Thailand may buy 300 surplus M-60 tanks from the United States. Even Pakistan, one of China's oldest and biggest customers, has expressed an interest in purchasing more Western arms.³⁸ Expanding its customer base beyond a few major buyers in Africa and Asia has proved equally difficult. China has tried without success to sell combat aircraft and other military equipment to Latin America, for example,³⁹ and a more competitive Third World arms market could dissipate its pricing and availability advantages and further expose its quality disadvantages. Unless it can develop more modern weapons to sell on the world market, therefore, China could start to lose important customers, and that would mean a loss of what has become a critical source of foreign currency.

³⁸MiG-29s for Iran," *Jane's Defence Weekly*, October 6, 1990; "Thais may get surplus M60s," *Jane's Defence Weekly*, August 11, 1990; "Pentagon Says Pakistan Has Funds to Buy Additional 60 F-16 Fighters," *International Defense Intelligence*, March 27, 1989.

³⁹Cohen, 1987; "Brazil Negotiating for Mirages; PRC Deal Possible," *Defense and Foreign Affairs Daily*, April 14, 1987.

III. FUTURE ARMS SALES AND CHINESE WEAPON MODERNIZATION

It has been argued that arms exports, and the foreign exchange they generate, are crucial to the future modernization of the PLA. At the same time, the potential for Chinese arms sales is greatly dependent upon China's ability to produce more advanced weapon systems. China is certainly at no loss for highly ambitious new weapon programs, and it currently has several projects at various stages of development that have the potential for export. However, probably only a few of these programs will actually lead to large-scale production efforts, including overseas sales, given the poor track record China has had with past programs. The problem appears to be twofold: Powerful domestic impediments still exist to modernization, and the prospects for securing foreign assistance, particularly foreign technology, remain limited.

CHINESE WEAPON PROGRAMS UNDER DEVELOPMENT WITH AN EXPORT POTENTIAL

Main Battle Tanks

In 1988, China revealed two new types of main battle tank, designated the Type-85II and Type-85IIA. The Type-85 class is derived from the Type-80 MBT, of which only a few were built for domestic consumption. The 39.5 ton Type-85 replaces the Type-80's Soviet-style cast turret with a welded turret having stratified/composite armor; the new MBT also features an all-welded steel hull, with provisions for installing a composite armor panel to the glacis. The main armament is a 105 mm rifled gun, which can fire either Chinese or Western ammunition. The Type-85 features the ISFCS-212 image-stabilized fire-control system. A model of the Type-85II was shown at a Chinese arms exhibition in late 1988, but its manufacturers insist that the tank could enter production as soon as orders are placed.¹

Another Chinese MBT under development is the *Jaguar*, a joint venture between Cadillac Gage Textron of the United States and the China National Machinery and Equipment Import-Export Corporation. The *Jaguar* design is based on the Type-59 chassis but with a new, Western-designed turret and hull of stratified/composite armor, a Detroit Diesel engine, and Allison transmission. The tank also features a rifled 105 mm gun capable of firing NATO standard ammunition, a digital fire-control unit, full night-vision capability, and an advanced suspension, all of Western origin. China intends to manufacture the

¹Bonsignore and Saw, 1989, p. 76; "China unveils two Type 80 MBT developments," *Jane's Defence Weekly*, February 11, 1989.

Jaguar, taking advantage of the country's low labor costs, and market the tank to the Third World for roughly \$1 million each.²

The Chinese also offer several retrofit packages for Type-59 and T-54/-55 tanks. These include a more powerful engine, an NBC system, a new fire-control system and gun stabilizer, and APFSDS-T (armor-piercing, fin-stabilized, discarding sabot-tracer) ammunition.

Combat Aircraft

China has four major combat aircraft programs currently in the works: the J-8II, the *Super-7* replacement for the J-7, the Q-5 upgrade, and the H-7 small bomber. The J-8II (known in the West as the F-8II) is a heavily redesigned version of the J-8I high-altitude, dual-engine interceptor, which itself is derived from the Mikoyan Ye-152A *Flipper* (a prototype that never went into Soviet production). The most important features of the new design are its solid nose (replacing the centerbody intake) and the heavy use of Western avionics. In 1986, the United States and China established the "Peace Pearl" program to upgrade the J-8 for the PLAAF, under the terms of a U.S. Air Force-sponsored Foreign Military Sale (FMS). In 1987, USAF awarded a \$550 million contract to Grumman Aerospace for 55 avionics upgrade kits, which included a version of the APG-66 pulse-doppler radar with a look-down/shoot-down capability (and the ability to fire semiactive radar-guided air-to-air missiles), a HUD, an inertial navigation system, mission and air-data computers, a digital databus, and requisite software. Although the Peace Pearl program has since been canceled, the Chinese have been fiercely marketing the J-8II (without the U.S. equipment), exhibiting it at the recent airshows in Paris and Farnborough.

Grumman also signed a direct deal with the Chinese to help develop the *Super-7* upgrade/replacement of the J-7 fighter aircraft. The *Super-7* is explicitly intended for export.³ Like the J-8II, the *Super-7* features bifurcated intakes and a solid nose for Western avionics, such as the APG-66 radar, as well as certain structural changes to the basic MiG-21 design. The aircraft also envisions a more powerful Western engine, possibly either the General Electric F404 or the Rolls-Royce RB-199. It is planned for use by the PLAAF (to replace the J-6 and J-7 fighters) and for export to the Third World, as a replacement for F-5s, MiG-21s, *Mirage* IIIs, and Chinese-built aircraft. The *Super-7* program was still only at the project-definition phase when it was placed in limbo by the Tiananmen crackdown.

²Bonsignore and Saw, 1989, p. 74; "Cadillac Gage and PRC Join to Develop New MBT," *Defense & Foreign Affairs*, December 1988; "Other News: China," *Military Technology*, December 1988, p. 87; "Wide Range of Armor at Defendatory," *Armed Forces Journal International*, November 1988.

³Fink and Proctor, 1989, p. 82.

In the late 1980s, the Chinese explored two possible upgrades for the Q-5, both utilizing Western avionics. One, designated the A-5M (the "A" indicates that the aircraft is intended for export as well), was a joint venture among Aeritalia of Italy, the Chinese National Aero-Technology Import-Export Company (CATIC), and the Nanchang Aircraft Company. The main feature of the A-5M is a new navigation/attack system, based on avionics originally developed for the Italian-Brazilian AMX attack aircraft; these include a central digital computer, a dual databus, a Litton inertial navigation system, an Agusta HUD, an air-data computer, a weapons aiming computer, the FIRR P-2500 ranging radar, IFF, and a radar warning receiver. Another upgrade project, the A-5K, was a collaborative effort between a French consortium led by Thomson-CSF and the PLAAF, involving a similar avionics upgrade using French components. The A-5K program has since been canceled, however, and the A-5M is reportedly in production.⁴

Finally, China is developing a multirole combat aircraft, termed the H-7 (export designation: B-7). The H-7 is roughly of the same class as the Panavia Tornado or the Su-24 and would fly both all-weather interdiction/strike and maritime attack missions. The first prototype reportedly flew in late 1988 or early 1989, and the Chinese claim that the aircraft will enter service in the PLA in 1993-94. However, few details about the H-7 have been released, and only models have so far been exhibited in the West, so the program's status cannot be ascertained. The H-7 will also probably need Western avionics, although Beijing claims that it has provided the aircraft with terrain-following radar and other avionics of "Chinese design and manufacture."⁵

Missiles

Building on its traditional strength in this area, China has several new types of antishipping missiles either in development or being offered for export. The C-101 is a supersonic, sea-skimming AShM. It is powered by two liquid-fueled ramjets and has a range of about 50 kilometers. The C-301 is a larger and heavier version of the C-101 and can fly about 100 kilometers. Both appear to be new, indigenous designs *not derivative* of the earlier Styx/HY-2 family. The Chinese have also developed an upgraded version of the C-801 AShM, designated the C-802, replacing the former's solid-propellant motor with an air-breathing turbojet, for increased range.

China has recently unveiled several new SAM systems. At the 1988 Asiandex exposition, the Chinese introduced a new, all-weather, low and very low altitude SAM

⁴China, "Milanews, October 1990.

⁵Jane's All the World Aircraft, 1990, p. 45.

system, designated the FM-80. The FM-80 consists of a mobile launcher containing four infrared-guided missiles, with a maximum range of 10 kilometers. The FM-80 bears a remarkable resemblance to the French *Crotale*, and it is speculated that the Chinese were able to obtain a *Crotale* unit from the Pakistanis and reverse-engineer it.⁶

Another new SAM system is the HQ-61 low-to-medium altitude SAM, which is similar to the U.S. *Sparrow* but both heavier and larger. The HQ-61 (sometimes also called the RF-61A) is available in both ship-based and mobile land-based versions. The missile uses semiactive radar homing and has a maximum range of 12.5 kilometers.

Little is known about the PL-9 SAM system for point air defense. Each unit carries four PL-9 *Atoll*-type, infrared-guided missiles on an armored vehicle, together with a target acquisition radar. Thus far, only models of the system have been presented.⁷

The Chinese are working on several new air-to-air missiles. The PL-4 is a semiactive, radar-guided AAM similar to the AIM-7 *Sparrow*. The PL-5 and PL-7 are believed to be reverse-engineered versions of the AIM-9 *Sidewinder* and R.550 *Magic* AAMs, while the PL-8 is either a license-produced or export version of the Israeli Python 3. All these missiles are still at the development or prototype stage.⁸

In surface-to-surface rockets and missiles, the Chinese are again poised to offer several systems to the Third World market. The M-1 system (also called the WS-1) is a truck-mounted multiple rocket launcher, and its unguided rocket has a range of 20 to 80 kilometers. The M-1B is a larger version and can deliver a 100 kilogram warhead up to 100 kilometers away. In addition, 122 mm and 273 mm multiple rocket launchers are available, with ranges of 20 kilometers and 80 kilometers, respectively. A variety of warheads, including cluster bombs and other submunitions, are either available or in development.⁹ In early 1990, there were reports that China had shipped M-1B rockets to either Iran or Iraq.¹⁰

The Chinese have two new types of SSM, the M-9 and M-11. The M-9, which is similar to the Soviet SS-23, has a range of 500 kilometers and is carried on its own transporter-erector-launcher (TEL). The M-11 is still in development, but it is speculated that it will have a range of 300 kilometers. In the late 1980s, Syria opened negotiations with China to buy M-9 SSMs; however, the current status of this purchase is undetermined. In early 1991,

⁶Bonsignore and Saw, 1989, p. 75.

⁷Gaines, 1990.

⁸*China Today: Aviation Industry*, 1989, pp. 303-305; "Missile Directory: Air-to-Air," *Flight International*, April 25-May 1, 1990, p. 22; Foss, 1991.

⁹Gaines, 1990; Bonsignore and Saw, 1989, pp. 75, 78; "China's WS-1 long-range rocket," *Jane's Defence Weekly*, March 11, 1989.

¹⁰Fletcher, 1990; "China: Missile Sales are Resumed To Raise Cash," *Financial Times*, March 28, 1990.

mobile launchers for the M-11 were spotted in Pakistan, along with dummy practice missiles, leading to speculation that the two countries have concluded a deal on the sale of this missile.¹¹

Other Weapon Systems

Helicopters. In the late 1980s, China joined with France, Australia, and Singapore to jointly develop and build a multipurpose light helicopter called NHL (*Nouvel Helicoptère Léger*), based on Aerospatiale's AS-350 *Ecureuil*. China would have its own assembly line for the NHL, which would have both civilian and military functions.

Trainer Aircraft. China has begun an unprecedented collaborative effort with Pakistan to design, develop, and build a primary jet trainer, designated the *Karakorum-8* (K-8), named after the mountain range that separates the two countries. The K-8 is a tandem-seat jet, powered by a Garrett TFE731-2A turbofan and incorporating a Collins EFIS-86 electronic flight instrumentation package, to be built under license in China. Carbon-fiber composites will also be used in the aircraft. Besides being intended for both the PLAAF and the Pakistani Air Force, the K-8 is aimed at the export market and will compete with such other trainers as the SIAI-Marchetti S-211, the Aermacchi MB-339, and the Czech L-39. The K-8 made its first flight in November 1990; production is scheduled to begin in the early 1990s.

Antitank Weapons. The Chinese have developed a second-generation antitank system called the HJ-8, a tube-launched, wire command-link, infrared-guided system, similar to the MILAN/HOT or the TOW. The HJ-8 can also be mounted on an APC or on the Z-9 helicopter (a license-built version of the Aerospatiale SA-365 *Dauphin 2*).

Naval Vessels. At the 1988 Asiandex exhibition, China unveiled designs for several "new" classes of naval vessels, including a frigate, a corvette, and a fast attack craft. Most of these designs, however, are simply upgraded versions of existing classes of Chinese warships. The proposed EF-4 missile frigate, for example, is reportedly based on China's *Luda*-class destroyer, replacing the *Luda*'s HY-2 AShMs with the C-801 and adding antisubmarine warfare (ASW) rocket launchers, SAMs, a close-in weapon system, and an ASW helicopter.¹² Various new types of *Jianghu*-class frigates have also been introduced, carrying either the

¹¹Nelan, 1991; Smith, 1991

¹²Bonsignore and Saw, 1989, p. 78; "New Chinese missile frigate design," *International Defense Review*, August 1987.

C-801 or ASW helicopters. China is also modernizing its *Huangfeng* and *Hegu* missile attack craft with the C-801/-802 AShM, new fire-control systems, and antiaircraft guns.¹³

Finally, China is offering a modified version of its Type-033-class submarine for export. Designated the E5SG, it is armed with the C-801 AShM.¹⁴

Other Weapon Systems. China has recently developed a 155 mm self-propelled gun/howitzer, equipped with a 155/45 mm barrel and a semiautomatic loader and capable of firing four to five rounds a minute. The gun vehicle is outfitted with a fire-control system containing a land-navigation/positioning device and a datalink to communicate with other vehicles and battery command posts. Towed versions of the 155 mm gun are also available.

China manufactures several types of jet engines, which are mostly used on Chinese fighter jets. As with most Chinese military equipment, these are based on Soviet designs and models, although they have been heavily modified and "nativized." Main Chinese turbofan engines currently in production are the WS-6 (which will power the H-7 bomber) and the WP-13 (used in the J-8II, J-7III and possibly the *Super-7*).¹⁵ Any of these engines could conceivably be offered to the export market, for example, to upgrade older or lower-powered MiG-21s.

Last but not least, China is offering several other weapon systems or technologies for export. These include an artillery fire-control system, consisting of a laser rangefinder and a data transfer link, a tungsten alloy penetrator for 100 mm armor-piercing projectiles, antipersonnel mines, a surface-to-air missile detector/jammer, and a dual-phase warhead for penetrating reactive armor.¹⁶ China has also been identified as possessing chemical weapons, whose technology could be made available for export.¹⁷

DOMESTIC IMPEDIMENTS TO MODERNIZATION

The first impediment to China's domestic military R&D program is a lack of money. Although the Chinese government has placed a priority upon the modernization of the PLA, it has not allocated the necessary additional resources. In fact, Chinese defense spending has declined considerably since the late 1970s. According to a 1988 CIA report, China's military operating budget had declined by about one-fifth from the previous eight years, while defense spending's share of total government expenditures dropped from

¹³PLA 'Huangfeng' PTGs Modernized," *Navy International*, January 1989.

¹⁴China, "Proceedings, p. 81.

¹⁵Fink and Proctor, 1989, pp. 87-89; *China Today: Aviation Industry*, 1989, pp. 199-223.

¹⁶Foss, 1989; "Chinese surface-to-air missile jammer," *International Defense Review*, March 1988.

¹⁷Adm Brooks names names," *Jane's Defence Weekly*, March 16, 1991.

approximately one-third in 1977 to one-fifth in 1987. Defense as a percentage of GNP fell from 12 to 5 percent over that same period.¹⁸

Of course, during that same time, the PLA shed 3 million men, or roughly half of its standing armed forces. The savings in personnel costs from such a move were actually less than might be expected, however, since the retiring of hundreds of thousands of professional soldiers sharply increased pension costs. As a result, the PLA was able to free up fewer surplus funds for force modernization than it had expected.¹⁹

Second, the low level of Chinese defense technology is well known, hampering the future of modernization programs. China's domestic military R&D is deficient in nearly all areas of technology considered to be on the cutting edge of weapon development, including carbon fiber composites, reactive armor, microelectronics, cybernetics, avionics, seekers, electronic countermeasures and counter-countermeasures, and jet engines. The Chinese frequently talk about the "satisfactory progress" that they have made in many areas of high technology, but it is difficult to judge the level and extent of this progress, especially compared with Western levels.²⁰ In many disciplines, Chinese technological development has stagnated; in the field of electronics, for example, the Chinese are believed to be at least 15 years behind the West.²¹ The Chinese may indeed have made great strides in certain areas of more advanced technologies, but it is almost entirely primary or theoretical research, with little incorporation beyond a few prototypes. In fact, the Chinese reportedly joke that they can build one or two (but *only* one or two) of anything.

Even when they have the technology, very little of this has yet reached the stage of practical application to Chinese weapon systems. Serial production of most high-tech systems also appears to be beyond their capabilities.²² For example, the most "modern" aircraft in China's arsenal, the J-8II, is already obsolete for a 21st century fighter. It is based on an original design that is at least 25 years old. The only composites to be found in the aircraft are in its tail. Its most important avionics, especially its radar, are all of Western origin; even then, its cockpit has been described as comparable to an early-generation F-4 *Phantom*.²³ The H-7 bomber will also contain little composite material; furthermore, it will not have the canard design usually found in modern aircraft design, nor will it be outfitted with a fly-by-wire system but instead will have a conventional flight

¹⁸Cited in Pollack, 1991, p. 30.

¹⁹Pollack, 1991, pp. 12-13, 30.

²⁰*China Today: Aviation Industry*, 1989, pp. 319-360.

²¹Tuomi and Vayrynen, 1982, p. 115.

²²Pollack, 1991, pp. 35-36.

²³Fink and Proctor, 1989, p. 70.

control system.²⁴ The Chinese still do not possess a working radar-guided air-to-air missile, limiting their air interdiction capabilities to very short ranges with infrared-guided AAMs. These deficiencies are most apparent when one looks at the kinds of basic technologies the Chinese are attempting to obtain from foreign sources: avionics from the United States and Italy, airborne early warning (AEW) radar and jet engines from Britain, missiles from France, etc. Rather than seeking help in improving their own indigenous technologies, they are simply attempting to acquire entire technologies outright (and on the cheap) and exploit it for their own needs.

The Chinese philosophy toward military R&D and production is not conducive to working with advanced technology. With few exceptions, mainly nuclear weapons research and ballistic missiles, the Chinese are not accustomed to devoting "long and painstaking R&D efforts" to perfect modern weapon systems. Instead, there is a tendency to rush a product through to production, despite the obvious problems such a move might incur (such as actually lengthening the "debugging" process).²⁵ Defense plants are ill-suited to the rigorous demands of today's high technology products, with antiquated machinery, inefficient production lines, and a dearth of automation and computerization. In addition, China's efforts at reverse-engineering have not been nearly as successful as they are often touted to be. Even though the J-7 was only partly reverse-engineered, the Chinese nevertheless lacked some equipment and technical data for the MiG-21, delaying work for several years.²⁶ A bootleg version of the French *Super Frelon* helicopter, the Z-8, was delayed for several years during the early 1980s, probably because of engineering problems.²⁷ More recently, the Chinese have experienced problems attempting to reverse-engineer the MiG-23s, T-62 tanks, *Crotale* SAMs, and *Magic* AAMs they received from Egypt or Pakistan; and to date, not a single Chinese-copy MiG-23 or T-62 has appeared in public, while China's reverse-engineered *Crotale* (FM-80) and *Magic* (PL-7) missiles are either crude copies or still in development.

Finally, China's military R&D is encumbered by a host of bureaucratic hindrances. Military production in China is plagued by a decentralized, redundant system of competing ministries and industries. Responsibility for defense materiel production is divided among several different ministries: for example, aviation (aircraft), aerospace (mainly missiles), electronics, ordnance, and shipbuilding. Each ministry nominally owns or controls all the defense plants within its particular manufacturing sector. In addition, the Ministry of

²⁴Fink and Proctor, 1989, p. 58.

²⁵Bai, 1987, p. 47.

²⁶*China Today: Aviation Industry*, 1989, p. 117.

²⁷*China Today: Aviation Industry*, 1989, pp. 179-180.

National Defense controls its own factories. Each industrial sector has also established its own trading company to promote exports and to manage collaborative programs with foreign sources. The North China Industries Corporation (NORINCO) is linked with the Ministry for Ordnance, CATIC has ties to the Ministry for Aviation, the China Precision Machinery Import-Export Corporation (CPMIEC) with the Ministry of Space Industry, etc. In addition, the PLA runs its own export company, Polytechnologies. Under Deng's "responsibility system," defense industries are expected to operate on their own generated revenues and without the guaranteed market for their products they used to enjoy under the old quota system (and in which the services were forced to accept equipment even if they did not require or desire it); yet they must also survive in a much smaller and more highly competitive domestic market.²⁸ Furthermore, whereas before these industries were confined to rather narrow ranges of activity (CATIC to aircraft; CPMIEC, missiles; NORINCO, ground equipment), they are now increasingly cross-competitive, especially in the export market. Polytechnologies, meanwhile, is authorized to sell all types of conventional weapon systems, from small arms to combat aircraft to ballistic missiles, in direct competition with CATIC, NORINCO, and others.²⁹

This fragmentation and competition are exacerbated by the persistence of overcapacity in Chinese military production. Mao's concerns about the vulnerability of Chinese defense plants to enemy attack led to the establishment in the 1960s of duplicate factories in the interior of the country, the so-called "third-line" defense industries. Not only are these plants frequently just as inefficient as the others, but in the current era of downsizing the PLA, there is excess production capacity overall in China's defense industry.³⁰

Ultimately, the problem here is the lack of centralized management over the whole process of research, development, testing, and production in China's massive defense industry. Technically, the Commission on Science, Technology, and Industry for National Defense (COSTIND) exerts central control, but it is much too small to be effective. As a result, there is no true central oversight directing defense planning and rationally allocating increasingly scarce defense funding to military R&D programs that show the most promise. Instead a fragmented, almost feudal system of defense industry fiefdoms has arisen, fraught

²⁸As domestic military orders have fallen, many defense plants have shifted into consumer and commercial manufacturing. The Shenyang Aircraft Corporation, for example, produces four-wheel-drive vehicles and food-processing equipment. Other defense industries have begun manufacturing refrigerators, bicycles, motorcycles, and radios, and some have expanded their subcontracting for overseas firms (the Chengdu Engine Company produces engine parts for Pratt & Whitney). CATIC has signed an agreement with Deutsche Aerospace to develop and build a regional transport aircraft. (Fink and Proctor, 1989, pp. 70-75, 78-81, 82-83, 87-89; Proctor, 1990, p. 81.)

²⁹Bonaignore and Saw, 1989, p. 74.

³⁰Pollack, 1991, pp. 5-6.

with duplication, overproduction, undercapitalization, and the inability to exploit available advanced technology.³¹

Chinese military R&D is still suffering from a hangover due to the Soviet style of planning and the ideological excesses of its past. The old quota system was a disincentive to technological innovation and modernization; with the emphasis on quantity and fulfilling quotas, it was easier simply to continue producing the same kinds of armaments, such as the Type-59 tank or the J-6 aircraft, despite their growing obsolescence. More critically, Mao's fitful efforts at creating a truly proletarian society in China had disastrous consequences for military R&D, especially for the development and introduction of more technological weapon systems. As previously stated, the "Great Leap Forward" greatly set back the J-6 and Q-5 programs; in fact, it was more than a decade from program start before series production of the Q-5 actually began. For its part, the 1966-76 Cultural Revolution disrupted both the J-7 and J-8 fighter programs. Although work on the J-7 began in 1961 and a prototype flew as early as 1966, it was not until 1979 that large-scale production of a qualitatively satisfactory version (the J-7II) was approved. The J-8 program was begun in 1964, but work was largely suspended until 1979; even then, only small numbers of the aircraft (less than 200 production J-8Is and perhaps a dozen J-8IIs, all prototypes) have thus far been built.³² Political events in China have left military R&D approximately 20 years behind the West technologically, while "inertial tendencies" of Soviet-style planning have made it difficult for the defense industry to adapt to a more competitive market system and fully exploit advanced technologies.³³ It is hardly much easier today, even under the current economic liberalization measures of the Deng regime. The lack of guaranteed internal customers for their products makes it hard for some defense industries to put precious resources into programs that may have no payoff. The struggle between economic reformers and communist hardliners still goes on; indeed, a defense plant manager may never know when the "responsibility system" may end and ambitious weapons projects be curtailed, and he could be branded a capitalist to boot.

LIMITS TO FOREIGN ASSISTANCE

The inability of China's domestic defense industry to generate the necessary technological developments for modernization has forced the Chinese to accept that they have few short-term alternatives except to go abroad for assistance. During the 1980s, the

³¹Pollack, 1991, pp. 32-37.

³²*China Today: Aviation Industry*, 1989, pp. 129-136, 151-155; Zhou, 1990.

³³Pollack, 1991, p. 36.

Chinese embarked on several overseas "shopping expeditions" and entered into several joint ventures with the West involving technology transfers. China began collaborative programs with various U.S. defense firms, including the J-8II avionics upgrade (with the blessing of the U.S. government), the *Super-7* fighter, and the *Jaguar* MBT. The United States also agreed to sell to Beijing four Mk.46 antisubmarine torpedos and four artillery-locating radar sets, and the technology and hardware to build two artillery ammunition factories in China to produce M-107 155 mm projectiles, M-577A1 and M-739A1 fuses, M-82 fuses, and high explosives.³⁴ China has purchased 24 Sikorsky S-70 Blackhawk helicopters and four Bell 214 helicopters; and, just before the Tiananmen crackdown, it had concluded a deal to buy six CH-47D Boeing Chinooks.³⁵ General Electric is providing LM-2500 gas turbines to power two new destroyers under construction in China. The United States, at one point or another, has offered to sell TOW antitank weapons, *Hawk* surface-to-air missiles, and the *Phalanx* close-in weapon system,³⁶ while China has expressed an interest in obtaining U.S. aircraft carrier technology.³⁷

The United Kingdom has also developed a close working relationship with the Chinese defense establishment. GEC has been supplying avionics kits for the F-7M and F-7P aircraft since the early 1980s, in what has been one of China's most successful collaborative programs for arms export. In the mid-1970s, China purchased a license to manufacture the Rolls-Royce Mk.202 Spey turbofan engine, which they designated the WS-9.³⁸ China and Britain have collaborated on the NVH-1 prototype infantry fighting vehicle (basically, a Type-531 APC with a British-produced turret gun). CATIC and Thorn-EMI have discussed cooperating on the development of an AEW aircraft, using Thorn-EMI's Skymaster early-warning and maritime reconnaissance radar. GEC, meanwhile, has offered to sell the airborne radars originally intended for the RAF's now-canceled *Nimrod* AEW aircraft program. China has also attempted to obtain an in-flight refueling capability from the British and, in the past, expressed an interest in buying *Sea Dart* SAMs (to upgrade its *Luda*-class destroyers) and Harrier jump jets.³⁹

In addition to the abortive A-5K upgrade and the aforementioned NHL program, France has sold the SA-342 *Gazelle*, AS-332 *Super Puma*, and *Dauphin 2* helicopters to Beijing, together with the rights to license-produce the *Dauphin*, which the Chinese

³⁴Dumbaugh and Grimmett, 1986, p. 94.

³⁵Gertz, 1989.

³⁶Dumbaugh and Grimmett, 1986, p. 95.

³⁷"Nimitz visit hints at Chinese carrier plans," *Jane's Defence Weekly*, March 18, 1989.

³⁸*China Today: Aviation Industry*, 1989, pp. 221-223.

³⁹Swanson, 1984, p. 93; Tow, 1984, p. 166; *China in Crisis*, 1989, p. 32.

manufacture under the name Z-9. Thomson-CFE has won a contract to upgrade two *Luda*-class destroyers, including a navalized *Crotale* SAM, the *Sea Tiger* air/sea search and target designation radar, and a TAVITAC tactical data handling system.⁴⁰ In the past, France has also attempted (unsuccessfully) to sell MILAN/HOT antitank guided weapons and *Mirage* 2000 fighter aircraft to China.

Other Western partners include Italy (the A-5M upgrade), Switzerland (Contraves had at one point agreed to sell its *Skyguard* air defense system to the PLA), and Germany (Daimler Benz has transferred technology to China for it to license-produce cross-country trucks for the PLA).⁴¹

Recent events have shown the limits to foreign collaboration with China, however. One of the fallouts from the Tiananmen crackdown was the West's cancellation or suspension of several of these joint arms ventures and the imposition of an embargo on military sales to China. The United States halted all further deliveries of weapons or military technology to China and suspended all commercial military sales (such as the *Jaguar* program and Grumman's *Super-7* deal), although many projects, particularly the J-8II upgrade program, were not canceled outright. Contraves has canceled its plans to sell the *Skyguard* to China. The future status of the Italian A-5M program, the British AEW project, and the French NHL undertaking are also unclear.

Of course, many countries' capacity for sustained moral indignation is rather low, and a few Western nations have already begun dealing with the Chinese again. The British government gave approval to GEC to continue providing avionics kits for the F-7M/F-7P program, arguing, "We imposed an arms ban. Avionics are not arms."⁴² The French are going ahead with plans to upgrade Chinese destroyers, and in October 1990 Thomson-CSF was cleared to sell radars and missiles to China, since it concerned "naval equipment that is in no way of a 'repressive' character."⁴³ Even the U.S. Department of Commerce has tried to permit the sale of high-speed computers to China, despite objections from the Defense Department.⁴⁴

Despite the resumption of some sales and joint ventures, the former euphoria about Sino-Western collaboration has waned, and the West is now sadder but wiser when it comes to working with the Chinese. Few Western sales to China have ever materialized.

⁴⁰"French to upgrade Chinese Luda destroyers," *International Defense Review*, August 1990.

⁴¹Bonsignore and Saw, 1989, pp. 75-76.

⁴²"U.K. to Allow Chinese Avionics Buy Despite Export Embargo," *Aerospace Daily*, September 18, 1989.

⁴³"France to send China missiles," *Flight International*, October 24-30, 1990.

⁴⁴"U.S. May Soon Begin Exporting Sophisticated Computer Equipment to China," *Inside the Pentagon*, July 12, 1990.

Prospective deals such as the Harrier, the *Mirage*, the MILAN and TOW, and the airborne refueling technology have all come to naught. Tiananmen proved that, in spite of certain economic reforms, Beijing is still basically a repressive communist dictatorship, which many Westerners will find reprehensible. To this should be added Chinese xenophobia and the limits this imposes on cooperation with the West. China's communist leaders, whether reformist or hardliners, do not wish to become overly dependent upon foreign technology, which could provide outsiders with leverage over their domestic policies.⁴⁵ It was the Chinese, and not the Americans, who eventually canceled the "Peace Pearl" J-8II upgrade program, in part because of cost overruns but in part also because of the way the Chinese believed they were treated by the United States after the Tiananmen crackdown.⁴⁶

Politics aside, other impediments to Sino-Western arms collaboration exist. One of these is a basic philosophical difference between the Chinese and their Western partners when it comes to the objectives of joint commercial ventures. Western companies would prefer to sell already manufactured systems to China or, at the very least, enter into licensed- or coproduction ventures with Chinese firms (capitalizing on China's low manufacturing costs, for instance). Beijing, however, does not possess enough hard currency to purchase abroad; despite numerous overseas visits and endless negotiations with Western defense firms, China has engaged mostly in "window-shopping and kicking tires,"⁴⁷ as well as gathering a lot of technical information. It would prefer to obtain foreign assistance and capital to modernize its indigenous defense industry. Hence, the Chinese emphasize Western investment, technology transfers, and as much national control over coproduction endeavors as possible. Essentially, they are saying to the West, "You give us the money, the know-how, and the factories, and we will build and sell it and give you a percentage of the profits." For these reasons, one should not be overly optimistic about the future of many current or envisioned collaborative arms programs.

Above all, the Chinese would prefer to own the technology and produce the systems themselves. Even here, they have had difficulties effectively exploiting Western technology even when it was made available to them. Perhaps the best example of this was China's experience with the Spey jet engine. The Chinese went to considerable efforts to obtain licensing rights to the Spey and to establish their own facilities for producing the engine, which they planned to use in their J-7III and the J-8 fighters. Over 40,000 pages of documents had to be translated into Chinese and 30,000 design drawings made up. Some

⁴⁵Tow, 1984, pp. 150-151.

⁴⁶Starr and Barrie, 1990.

⁴⁷Lee, 1987-88, p. 42.

700 advanced machine tools and facilities had to be imported. Yet in the end, only a handful of Speys were ever built, and by their own admission, "there was no proper application for the engine."⁴⁸ It was too big for the J-7, and the Chinese experienced technical problems installing a single Spey engine in the J-8.⁴⁹

As a result of these various hurdles, few Sino-Western joint ventures have ever gotten as far as the prototype stage, and even those stand little chance of progressing much further. A majority of these endeavors in importing Western systems/technologies or in collaboration have either been canceled or are currently on hold (and with few prospects of being restarted). Future Western assistance in modernizing China's defense industry is unlikely to be substantial, therefore.

Two non-Western countries, Israel and the Soviet Union, appear to be stepping into the West's place. Although the two countries have no formal diplomatic relations, secret military ties between Israel and China allegedly date back to 1980, and various reports estimate that Israel has exported between \$1 and \$3 billion worth of arms and technology to the People's Republic. Tel Aviv has supposedly sold China laser-guided armor-piercing warheads; 122 mm, 130 mm, 152 mm, and 155 mm artillery ammunition; and 105 mm cannons for refitting Type-59 tanks.⁵⁰

In addition, since Tiananmen, Israel has emerged as China's leading foreign supplier of advanced technology. There have been reports that Israel has aided China in developing the HQ-61 surface-to-air missile, that it provided improvements to the guidance systems for the CSS-2 IRBMs that China sold to Saudi Arabia, and that it helped the Chinese produce their own version of the Israeli *Gabriel* ASHM. The Israelis are allegedly providing advanced missile guidance technology to the Chinese and helping them develop reactive armor for Chinese tanks. The new Chinese PL-8 air-to-air and surface-to-air missile, for example, is supposedly a direct copy of the Israeli Python 3 missile. Israel is also helping the Chinese develop an airborne early warning system, converting a Y-8 (An-12) transport plane into an AEW aircraft. Finally, there are indications that the Israelis are aiding China in developing a new multirole combat aircraft, using technology derived from the canceled Lavi fighter program—a project that received a great deal of U.S. financial and technical assistance. In fact, Israel has been termed China's "back door" to U.S. technology.⁵¹

⁴⁸*China Today: Aviation Industry*, 1989, pp. 221–223.

⁴⁹"The Air Force of the People's Liberation Army," *International Air Forces and Military Aircraft Directory*, Aviation Advisory Services, Ltd., 1988.

⁵⁰"Secret Missile Deal with Israel," *Asian Defence Journal*, May 1988; Swain, 1988; Fisher, 1988.

⁵¹See "Secret Missile Deal with Israel," *Asian Defence Journal*, May 1988; Swain, 1988; "The CPMIEC HQ-61 surface-to-air missile system," *Military Technology*, March 1987, p. 50; Ottaway, 1988; "Israel: Israel Supplying

The Chinese have also begun to look to the Soviets as possible providers of arms and technology. Chinese officials already have expressed an interest in purchasing MiG-29 *Fulcrum*, Su-24 *Fencer*, and Su-27 *Flanker* aircraft or in acquiring Soviet aircraft radar and weapons-ranging equipment. China is also interested in Soviet assistance with aircraft carrier technology. A Sino-Soviet arms deal could be a "natural," in fact. Chinese military systems, since they are largely based on Soviet designs, would probably be better able to absorb Soviet equipment and technology. Sino-Soviet ties have improved immeasurably in the past year, which could facilitate an arms deal. Many of China's objections to better relations with Moscow (the Soviet presence in Afghanistan, Vietnam's occupation of Cambodia, the number of troops along the Sino-Soviet border, etc.) have more or less been resolved, and this new relationship was capped by Gorbachev's visit to China—the first by a Soviet leader in nearly 30 years—in May 1989.⁵²

Nevertheless, there are limits even to these dealings. Beijing risks alienating Arab states and the rest of the Third World (who are also important arms clients) by pursuing too close or too open a relationship with the Israelis; similarly, Israel would not want to upset the United States by providing too much advanced technology to China. The new Sino-Soviet relationship is still too young to be certain of its long-term successes. The USSR faces the same problems as do Western defense firms: The Chinese want less to buy surplus Soviet equipment than they desire technology transfers and license production rights. It is doubtful at this juncture that the Soviets would be willing to release such critical, sophisticated know-how as MiG-29 or aircraft carrier technology, however.⁵³ Furthermore, when the Chinese do wish to buy modern Soviet weaponry outright, they want "friendship prices" and a barter arrangement to cover all or part of the purchase, while the Soviets demand full price (\$35 million to \$40 million for a Su-27, for example) and in hard currency.⁵⁴

China with Military Technology, Paper Says," *Reuters*, June 13, 1990; Foss, 1991; "China's changing doctrine," *Jane's Defence Weekly*, March 11, 1989, p. 442.

⁵²See Southerland, 1990; China seeking Soviet fighters," *Jane's Defence Weekly*, July 21, 1990; "Arms Trade: Rebirth of a salesman," *Economist*, "China," *Milavnews*, August 1990; Tai, 1990a.

⁵³Tai, 1990a; "China," *Milavnews*, August 1990.

⁵⁴Karniol, 1991. In actuality, a barter arrangement whereby China would exchange its surplus of light industrial goods for the USSR's overabundance of military materiel is very likely. There is some precedent for such an arrangement, in fact. In late 1989, a Chinese firm traded \$95 million worth of consumer products for six Soviet civilian aircraft (see "China: China Firm Set to Barter Consumer Goods for Soviet Planes," *Reuters*, November 30, 1989).

IV. CONCLUSIONS

Chinese weapons appear to have contributed little serious offensive capability to the Third World arsenals in which they can be found. The effect of these weapons on U.S. options for direct military intervention in regional conflicts is limited. In most cases, these arms would be no match for technologically superior U.S. or other Western weapon systems. For example, U.S. countermeasures should easily outwit Chinese antishipping or antiaircraft missiles; Chinese antitank weapons probably could not penetrate U.S. armor. Chinese armaments in the arsenals of potential U.S. adversaries (e.g., Iraq or North Korea) are not usually found in frontline forces. In the Gulf war, Chinese weaponry in the Iraqi armed forces did not distinguish itself in battle; in the one recorded instance where the Iraqis fired a *Silkworm* missile at a British frigate, the British easily shot down the incoming weapon. At best, therefore, these weapons might be said to have a nuisance value.

The transfer of Chinese weaponry to Africa, Asia, or the Middle East generally has not led to any substantial military destabilization of these regions, or at least they have not been as serious a cause as the sale of Soviet, Western, or other Third World arms. For the most part, the kinds of other Third World forces these weapons would conceivably go up against (e.g., Pakistan vs. India, Egypt vs. Israel, Zimbabwe vs. South Africa) are usually superior in firepower and offensive capacity, sometimes vastly so. Chinese equipment in Iran's armed forces was no match for the Soviet or French arms in Iraq's army, for example. In several instances, therefore, Chinese systems have served mainly to boost a Third World country's *defensive* capacities, by improving its ability to patrol and protect its national airspace or territorial waters and guard its frontiers.

Of course, there are important exceptions to this rule, and in certain key areas Chinese arms sales could endanger important U.S. clients in the developing world or even constitute a threat to U.S. strategic interests in various Third World regions. China, often with help from Western friends, produces a few very potent weapon systems that could profoundly affect regional military balances. As previously stated, these include the F-7M *Airguard*, the *Silkworm* family of antishipping missiles, and various types of ballistic missiles. Although Iran's *Silkworm* missiles were not much of a threat to military vessels, they nevertheless sent chills down the spine of commercial shipping in the Gulf. The risk stemming from the possible proliferation of Chinese ballistic missile systems or SSM technology is self-evident. The transfer of CSS-2 IRBMs to Saudi Arabia is a good example of how Chinese arms sales can undermine U.S. political goals in the Third World, while the

possible sale of M-9 short-range ballistic missiles to Syria or the M-11 to Pakistan could be a serious military challenge as well to U.S. or Western interests in the Third World (e.g., threatening Israel).

Chinese arms production and exports could weaken U.S. strategic ties with various friends and allies in the Third World. Thailand has used its weapon purchases from China to lessen its dependence upon the United States for arms, and the CSS-2 missile sale temporarily at least cooled Saudi-American relations; in addition, Israeli military assistance to China is a potential source of friction between Tel Aviv and Washington.

The low cost of Chinese equipment permits an attacker the option of using superior numbers to overwhelm a technologically more advanced opponent. For all these reasons, therefore, the potential political/military effect of Chinese weapon systems in the Third World, although small, cannot be totally ignored.

At the same time, the prospects for *future* Chinese weapon sales to the Third World are not bright. Not only are Third World arms purchases dropping, but China is losing its share of the market. The People's Republic risks losing many of its traditional and more recent customers if it cannot satisfy growing demands for weaponry of higher quality and more advanced technology—e.g., precision-guided munitions, SAMs, ballistic missiles, and submarines. It is uncertain whether the recent Gulf war will lead to a resurgence in arms sales to the Middle East from which the Chinese could profit, or to the imposition of a strict weapons export control regime on this region (particularly where Iraq is concerned), as many have called for. Even if there is an increase in such sales, it is more likely that *Western* and not Chinese weaponry (or Soviet arms, for that matter) will benefit from such an upsurge.

With few new large arms agreements in the offing, Beijing is faced with three options. One is to make up for this with lots of small sales, particularly by concluding arms deals with countries to which China has not previously sold weapons. Chinese armaments still have the advantage of low price, simplicity, and ruggedness, and, to its credit, China has enjoyed some recent success in expanding its customer base, selling military transport aircraft to Sri Lanka, concluding a modest arms agreement with Burma, opening talks with Indonesia on the possible sale of frigates, and so forth. However, Beijing has always had a very limited clientele, few of whom are among the major Third World buyers of arms, and it has thus far failed to penetrate several potentially lucrative markets, such as Latin America, Northern Africa (aside from Egypt), or, outside of a few customers, the Middle East. Part of the difficulty here is political; many of the countries in these regions are either Soviet (Syria, Libya) or American (Honduras, Morocco, Saudi Arabia) client states. Others, such as the conservative Arab states, Chile, and rightist regimes in Central America, are traditionally

anti-“Red China,” and many in fact still recognize Taiwan as the Republic of China. The People's Republic has historically had few diplomatic dealings with countries in these regions, so its ties to these areas tend to be weak. Still other Third World countries are themselves competitors with China for Third World arms sales (e.g., Brazil and Argentina). Finally, China's edge in pricing and availability could deteriorate, as the Soviet Union, the former East European communist states, and even the West—who are all in the process of greatly reducing their armed forces and are flush with excess weaponry and overcapacity in their defense production—might flood the world arms market with high quality second-hand weapons at rock-bottom prices.¹

As a second option, China can accelerate its modernization and upgrades programs to stay competitive. Achieving that, however, will be nearly impossible without massive amounts of foreign assistance, both financial and technological, which in the present political atmosphere is difficult to foresee. Yet even if certain foreign collaborative programs do come back on line, they will remain modest compared with China's overall military modernization requirements.

Finally, the Chinese could choose to specialize in their future modernization and arms sales. Drawing on traditional strengths in certain areas of domestic military R&D and production—again, mainly combat aircraft, ASHMs, and surface-to-surface missiles—and making pointed use of foreign assistance in key fields, China could carve out quite a good-sized niche for itself in a few highly lucrative categories of arms (and thus help underwrite the modernization of the PLA). Perhaps the most important of these is low-end combat aircraft. Over the next decade, several dozens of countries around the Third World will need to start replacing aging MiG-19s, MiG-21s, *Mirage* IIIs, and F-5s. Neither the Soviet Union nor the West (since the cancellation of the F-20 *Tigershark*) has any program for producing a simple, low-cost, light combat fighter. The MiG-29 and Su-27 are large, complex aircraft, suited more to current Soviet needs than to those of most Third World countries. The French *Rafale*, the European Fighter Aircraft, and the Swedish *Gripen* are all too expensive. The British Aerospace *Hawk* 200 is touted as a low-cost fighter jet, but it lacks a true fighter's supersonic speed and maneuverability. Even the F-16 has grown too heavy and too expensive for much of the Third World. The market, therefore, is wide open to a Chinese fighter option, such as the *Super-7*, should the Chinese be able to get such a program off the

¹For example, Czechoslovakia announced in May 1991 that it is thinking of selling surplus T-72 tanks to Syria and Iran, to stave off massive layoffs in its domestic defense industry (see Battista, 1991).

ground and running. Furthermore, the K-8 trainer/light attack jet could offer serious competition in Third World markets, and this program should also be closely watched.

China has long been quite strong in the area of antishipping missiles, and such new systems as the C-802, C-101, and C-301 AShMs offer a cheap, plentiful, and fairly sophisticated option for Third World countries wishing to strengthen coastal defenses and ship-to-ship capabilities; in conjunction, China could expand its sales of missile patrol craft and frigates (armed with the new AShMs) and its retrofit of existing naval vessels with more modern antishipping weapons. China could also become a major supplier of ballistic missiles, particularly the M-9 and M-11 SSMs, as well as offer several kinds of key upgrades, subsystems, and technologies for export, including T-54/-55 tank retrofits, fire-control systems, and SAM/SSM/AShM technology transfers. Finally, as is already evident in such endeavors as the Sino-Pakistani K-8 aircraft and China's aid to Iran's ballistic missile program, China could become increasingly active in joint ventures with other Third World countries in developing and producing weaponry.

The emphasis in Chinese arms transfers to the Third World could undergo a dramatic shift, therefore. China may continue to provide low-end military equipment to the Third World, but increasingly its arms exports could be directed toward fulfilling a few niches of "mid-tech" weaponry, if it acted to put the right priorities and resources into those programs with the most potential for foreign sales. In fact, there are some indications that China might indeed be moving in such a direction, given its recent efforts to push its missile products and to find foreign partners for its aircraft programs (while maintaining a certain level of sales of its more traditional main battle tanks, artillery, ammunition, and patrol craft). If so, then Chinese weapon sales to the Third World, although fewer perhaps, eventually could considerably influence regional military situations.

BIBLIOGRAPHY

- Ackerman, Julia, "Asia/Pacific: PRC/Thai Deal," *Defense & Foreign Affairs*, June 1988.
- _____, "Grumman's Chinese F-8 Avionics to Begin with Four Prototypes," *Defense & Foreign Affairs*, October/November 1987.
- "The Air Force of the People's Republic of China," *Military Technology*, February 1988.
- "Airscape: China," *Air International*, August 1985.
- "Airscape: China," *Air International*, March 1989.
- "Arms trade: Rebirth of a salesman," *The Economist*, July 28, 1990.
- Bai Si Yeng, "Technological level and technological pride," *Military Technology*, March 1987a.
- _____, "Understanding the Chinese defence industry," *Military Technology*, March 1987b.
- Barrie, Douglas, "Nimrod AEW radar for China," *Jane's Defence Weekly*, June 16, 1990.
- Battiat, Mary, "Czechoslovakia Considers Selling Tanks to Syria, Iran," *Washington Post*, May 7, 1991.
- Baum, Julian, and Daniel Sneider, "China hawks its military wares on the world market," *Christian Science Monitor*, November 19, 1986.
- "Boeing in Chinese Chinook deal," *Jane's Defence Weekly*, 4 February 1989.
- Bonsignore, Ezio, and David Saw, "An Update on Chinese Affairs: Asiandex '88," *Military Technology*, February 1989.
- de Briganti, Giovanni, "Singapore Joins France, China, Australia in Helicopter Project," *Defense News*, April 17, 1989.
- Brzoska, Michael, and Thomas Ohlson, *Arms Transfers to the Third World, 1971-85*, Stockholm International Peace Research Institute, 1987.
- Bussert, Jim, "PLAAF Avionic Technology and Upgrades," *Defense Electronics*, June 1990.
- "China," *Proceedings*, March 1988.
- "China's Aircraft Industry. . . an enigma resolved," *Air International*, January 1990.
- "China arms for Iran," *Asian Defence Journal*, June 1984.
- "China hopes for Super-7 restart," *Jane's Defence Weekly*, 24 February 1990.
- China in Crisis: The Role of the Military*, Jane's Defence Data, 1989.

- "China Offers Submarines, AAMs to Thailand," *Defense & Foreign Affairs Daily*, August 6, 1987.
- "China shows wide range of equipment," *International Defense Review*, June 1989.
- China Today: Aviation Industry*, compiled by the editorial board of the *China Today* series, Tri-Service Press, 1989.
- "China unveils anti-tank helicopter," *Jane's Defence Weekly*, 22 April 1989.
- "China unveils point defence missile," *Jane's Defence Weekly*, 11 February 1989.
- "China: After U.S. Jet Deal Collapse, China May Go Elsewhere," *Reuters*, 17 May 1990.
- "China: Paying the price of 'bloody crackdown'?" *Jane's Defence Weekly*, 17 June 1989.
- "China's arms cross the oceans," *International Defense Review*, July 1987.
- "China's K-8 Trainer Makes First Flight; Formal Rollout Expected in January," *Aviation Week & Space Technology*, December 10, 1990.
- "China's M11 is unveiled," *Jane's Defence Weekly*, 9 April 1989.
- "Chinese Cancel Deal To Modernize Fighter," *Defense News*, May 21, 1990.
- "Chinese Find Little Interest In F-8 Fighter at Paris," *Aviation Week & Space Technology*, June 19, 1989.
- Chu, Wellington, "Increased Military Sales to China: Problems and Prospects," *Journal of International Affairs*, Winter 1986.
- Cohen, Martin, "Latin-PRC Arms Prospects," *Defense & Foreign Affairs*, October/November 1987.
- "Collins Signs Agreement with People's Republic of China for Avionics," *Avionics Report*, November 18, 1988.
- Condom, Pierre, "Grumman joins China to make the Super-7," *Interavia*, December 1988.
- Darwish, Adel, "China: Government Agrees to Help Update Egypt's Missiles," *Independent*, June 14, 1990.
- Deen, Thalif, "Arms race spirals in Middle East," *Jane's Defence Weekly*, 26 August 1989.
- "Defense Update: NHL May Proceed Without China," *Rotor & Wing International*, September 1989.
- Dorsey, James M., "Iraq gets Chinese aid on A-bomb," *Washington Times*, December 14, 1989.
- Dumbaugh, Kerry B., and Richard F. Grimmett, "Arms Sales to China: The Limits to U.S.-Chinese Military Cooperation," *The Washington Quarterly*, Summer 1986.

"Fantan . . . the Chinese gamble," *Air International*, July 1988.

"Farnborough Airscene: A CATIC representative revealed, . . ." *Air International*, October 1988.

Fink, Donald E., and Paul Proctor, "China Aviation: At a Critical Crossroads," *Aviation Week & Space Technology*, December 11, 1989.

Fisher, Dan, "Israel Trying to Curb Missile Sales to Arabs," *Los Angeles Times*, July 6, 1988.

Fletcher, Martin, "China: U.S. Investigates Alleged Export of Missiles," *Times*, 28 March 1990.

Foss, Christopher F., "China launches latest export technologies," *Jane's Defence Weekly*, 27 May 1989.

_____, "Sino-Israeli link in new AA system," *Jane's Defence Weekly*, 13 April 1991.

"France, China and Australia Plan Consortium to Build New Helicopters," *International Defense Intelligence*, October 24, 1988.

Frankenstein, John, "People's Republic of China: Defense Industry, Diplomacy, and Trade," in James Everett Katz (ed.), *Arms Production in Developing Countries*, Heath, 1984.

Frost, Roger, "Pakistan Aeronautical Complex: The greening of Kamra," *International Defense Review*, June 1989.

Furlong, Bob, "The dragon takes off, slowly: An assessment of the Chinese Air Force," *International Defense Review*, September 1987.

"GEC to go ahead with Chinese contract," *Jane's Defence Weekly*, 23 September 1989.

Gaffney, Tim, and Charlene Lee, "Air Force-China program goes on despite suspension," *Dayton Daily News*, September 30, 1989.

Gaines, Mike, "China fields new missile systems," *Flight International*, 11-17 April 1990.

Gargan, Edward A., "Beijing Faults U.S. High-Tech Curbs," *New York Times*, October 24, 1987.

Gertz, Bill, "China helps Algeria develop nuclear weapons," *Washington Times*, April 11, 1991.

_____, "Chinese move seen as aiding Libya in making poison gas," *Washington Times*, July 12, 1990.

_____, "Chinese not likely to be crippled by U.S. arms cutoff," *Washington Times*, June 6, 1989.

Gordon, Michael R., "U.S. Worried That China May Again Sell Missiles," *New York Times*, November 9, 1989.

- _____, "War in Gulf Spurs China's Arms-Export Role," *New York Times*, May 19, 1987.
- Greenberger, Robert S., "Chinese Missiles Are Apparently on Way to Iran," *Wall Street Journal*, December 21, 1987.
- _____, "U.S. Arms Sales to China Stir Questions and the Ire of Some Conservatives," *Wall Street Journal*, May 5, 1986.
- Grimmett, Richard F., *Trends in Conventional Arms Transfers to the Third World by Major Supplier 1982-1989*, Congressional Research Service, June 19, 1990.
- "Grumman, China to Upgrade Fighter," *Armed Forces Journal International*, December 1988.
- "Grumman to upgrade Chinese F-7Ms," *Flight International*, November 26, 1988.
- Guoxing, Ji, "China's Defence Modernisation and Security Policy," *Asian Defence Journal*, October 1988.
- Holley, David, "China to Join Iraq Arms Embargo," *Los Angeles Times*, August 6, 1990.
- Hollingworth, Clare, "China is Taking Up the Arms Trade," *Asian Wall Street Journal*, June 17, 1985.
- _____, "China: New era for the PLA, but defence has low priority," *Pacific Defence Reporter*, Annual Reference Edition, 1988.
- _____, "China (PRC): Arms Exports, Production Examined," *Defense & Foreign Affairs Daily*, May 2, 1985.
- Hooton, Ted, "France to upgrade Chinese Luda destroyers," *International Defense Review*, August 1990.
- Hussain, Mushahid, "Pakistan reaches MBT 'milestone,'" *Jane's Defence Weekly*, 11 August 1990.
- "International Defense Digest: Chinese aircraft for Chile?" *International Defense Review*, March 1988.
- "International Defense Digest: Grumman wins big PRC contract," *International Defense Review*, September 1987.
- "Iraq's Military Bankrolled By USSR, China, France," *Defense Week*, August 20, 1990.
- Jacobs, G., "China's changing doctrine," *Jane's Defence Weekly*, 10 March 1990.
- Jane's All the World's Aircraft, 1988-89, 1989-90, and 1990-91*, Jane's Information Group, 1988, 1989, 1990.
- Jane's Armour and Artillery, 1988-89 and 1990-91*, Jane's Information Group, 1988, 1990.
- Jane's Fighting Ships, 1990-91*, Jane's Information Group, 1990.

Jane's Weapon Systems, 1-88, Jane's Publishing Company Ltd., 1987.

"Jottings: Beijing: China Will Move into Full-Scale Production of the Zhishengji-8 Heavy Helicopter, . . ." *Asian Defence Journal*, May 1990.

Karniol, Robert, "China gearing up to project power," *International Defense Review*, August 1988a.

_____, "Indonesia, China frigate talks," *Jane's Defence Weekly*, 15 September 1990a.

_____, "Su-27 talks stall over price," *Jane's Defence Weekly*, 23 March 1991.

_____, "Thailand to buy Chinese frigates," *International Defense Review*, August 1988b.

_____, "Thailand: C-801 missile buy approved," *Jane's Defence Weekly*, 18 August 1990b.

Lardner, Richard, "Report Says Syria Signed Deal with China to Buy Surface-to-Surface Missiles," *Inside the Pentagon*, August 18, 1989.

Lardner, George, Jr., "U.S. Began Lifting Business, Military Sanctions on China Months Ago," *Washington Post*, December 12, 1989.

Latham, Richard J., "The People's Republic of China: Profits, Consumerism, and Arms Sales," in James Everett Katz (ed.), *Implications of Third World Military Industrialization*, Lexington Books, 1986.

_____, "People's Republic of China: The Restructuring of Defense-Industrial Policies," in James Everett Katz, ed., *Arms Production in Developing Countries*, Heath, 1984.

Lee, Wei-chin, "The Birth of a Salesman: China as an Arms Supplier," *Journal of Northeast Asian Studies*, Winter 1987-88.

Lynch, David J., "U.S. Industry Cuts Ties With Chinese," *Defense Week*, June 19, 1989.

Mann, Jim, "China May Be Giving A-Arms Aid to Algeria," *Los Angeles Times*, April 12, 1991.

_____, "China-Syria Missile Deal Concluded, Officials Say," *Los Angeles Times*, July 14, 1990a.

_____, "U.S. Diplomat Seeks Chinese Cooperation," *Los Angeles Times*, August 5, 1990b.

The Military Balance, 1990-91 International Institute for Strategic Studies, London, 1990.

Moore, Molly, "China Sends New Weapons to Iraqis," *The Washington Post*, June 27, 1987.

Navias, Martin, *Ballistic Missile Proliferation in the Third World*, Adelphi Papers, No. 252, International Institute for Strategic Studies, Summer 1990.

Nelan, Bruce W., "For Sale: Tools of Destruction," *Time*, April 22, 1991.

"New Chinese SAM missile system," *International Defense Review*, March 1988.

- Ottaway, David B., "Israelis Aided China on Missiles; Weapons for Saudis Improved Despite Potential Threat," *The Washington Post*, May 23, 1988.
- "PRC To License-Build Collins Avionics," *Defense & Foreign Affairs Weekly*, February 26–4 March, 1990.
- "Pakistan and China Develop New Trainer Aircraft," *Defense & Foreign Affairs Weekly*, March 13–19, 1990.
- "Pakistan Plans to Sell Chinese-Built F-6 Fighters to Bangladesh," *International Defense Intelligence*, August 21, 1989.
- Perera, Judith, "The Missile Race Hots Up," *South*, August 1989.
- Platt, Adam, "China: People's Army Marks Time While the Economy Regroups," *Insight*, June 2, 1986.
- Pollack, Jonathan D., "Structure and Process in the Chinese Military System" (draft copy), in David M. Lampton and Kenneth G. Lieberthal (eds.), *Bureaucratic Structure and Policy Process in China*, University of California Press, 1991.
- Preston, Antony, "The Changing Face of the PLA Navy," *Asian Defence Journal*, August 1989.
- Proctor, Paul, "Pacific Rim Aerospace Companies Expand Ties to European Aircraft, Engine Firms," *Aviation Week & Space Technology*, September 3, 1990.
- Richardson, Michael, "Chinese stockpile for Thailand causes concern," *Pacific Defence Reporter*, March 1989.
- Robinson, Gwen, "Join Sino-Thai arms venture," *Pacific Defence Reporter*, April 1989.
- SIPRI Yearbook: World Armaments and Disarmament, 1969–70, 1972, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989*, Stockholm International Peace Research Institute, 1969, 1972, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989.
- Sassheen, R.S., "China: Six-Fold Jump in Arms Trade," *Asian Defence Journal*, November 1987.
- Sieff, Martin, "U.S. takes China's word on missiles," *Washington Times*, January 12, 1990.
- Silverberg, David, "China's Future as Arms Merchant Clouded by Iran-Iraq Ceasefire," *Defense News*, August 14, 1989.
- "Sino-Pakistan aircraft project," *International Defense Review*, March 1989.
- Slade, Stuart, "Chinese armoured vehicles: You get what you pay for," *International Defense Review*, January 1990.
- Smith, R. Jeffrey, "Chinese Missile Launchers Sighted in Pakistan," *The Washington Post*, April 6, 1991.

- Southerland, Daniel, "China Seeks Technology From Soviet Military," *The Washington Post*, July 17, 1990.
- _____, "China's Premier Says Beijing Seeks to Block Arms Sales to Iran, Iraq," *The Washington Post*, September 27, 1987.
- Sparks, Jon, "China's modernising navy: Technology transplants for the PLAN," *International Defense Review*, February 1989.
- Starr, Barbara, "China considers carrier plans," *Jane's Defence Weekly*, 16 June 1990.
- _____, and Douglas Barrie, "China drops F-8 upgrade," *Jane's Defence Weekly*, 26 May 1990.
- Stephens, Philip, "UK Government concedes China fighter exports," *London Financial Times*, September 15, 1989.
- Sun, Lena H., "China to Halt Arms Sales to Iraq," *The Washington Post*, August 6, 1990a.
- _____, "Chinese Said to Sell Chemical to Iraq," *The Washington Post*, October 1, 1990b.
- "Supersonic missiles from China," *International Defense Review*, August 1989.
- Swain, Jon, "Israel in secret missile deal with China," *Sunday Times*, 3 April 1988.
- Swanson, Bruce, "Naval Forces," in Gerald Segal and William T. Tow (eds.), *Chinese Defence Policy*, University of Illinois, 1984.
- Sweetman, Bill, "Air Forces," in Gerald Segal and William T. Tow (eds.), *Chinese Defence Policy*, University of Illinois, 1984.
- "Syria to buy Chinese missiles," *Flight International*, 12 August 1989.
- Tai Ming Cheung, "China poised to buy Soviet fighters: A sale is in the air," *Far Eastern Economic Review*, 6 September 1990a.
- _____, "China: Military opening windows to the world," *Pacific Defence Reporter*, Annual Reference Edition, 1988a.
- _____, "Looking outwards: expanding Sino-foreign military relations," *Pacific Defence Reporter*, February 1988b.
- _____, "Nuclear deal on Han," *Far Eastern Economic Review*, 6 September 1990b.
- "Thai Army continues to Expand: US M-48s Acquired," *Defense & Foreign Affairs Weekly*, June 12-18, 1989.
- "Thailand Seeks 100 Helicopters and 700-800 Armored Personnel Carriers," *International Defense Intelligence*, June 19, 1989.
- Thayer, Nate, "China sends tanks to Khmer Rouge," *Jane's Defence Weekly*, 13 October 1990.

- Tow, William, "Arms Sales to China," in Gerald Segal and William T. Tow (eds.), *Chinese Defence Policy*, University of Illinois, 1984.
- Tuomi, Helen, and Raimo Vayrynen, *Transnational Corporations, Armaments, and Development*, St. Martin's Press, 1982.
- "Turbojet updates China's C 801," *Jane's Defence Weekly*, 25 February 1989.
- Tyson, James L., "China Tried To Sell Iraq Arms After Embargo," *Christian Science Monitor*, January 31, 1991a.
- , "China Will Ignore US Pressure to Stop Selling Its Missiles," *Christian Science Monitor*, March 29, 1991b.
- "USA: Bush Embarrassed by Chinese Missiles," *Reuters*, 31 March 1990.
- "USA: New Chinese Missile Could Upset Mideast Arms Balance," *Reuters*, 9 May 1990.
- "USA: U.S. Tightens Up on Hi-Tech Exports to China," *Reuters*, 5 June 1990.
- Warwick, Graham, "Grumman resumes work on F-8II," *Flight International*, March 28–4 April, 1990.
- Weisskopf, Michael, "China Sells Arms to Iran via N. Korea," *Washington Post*, April 3, 1984.
- Woon, Eden Y., "Chinese Arms Sales and U.S.-Military Relations," *Asian Survey*, June 1989.
- World Military Expenditures and Arms Transfers 1987*, Arms Control Association/Arms Control and Disarmament Agency, 1987.
- Young, P. Lewis, "Events in Beijing Strain Thailand's Defense Links with China," *Armed Forces Journal International*, August 1989.
- Yu Yu-lin, "U.S. Security Interests and the Sale of Arms to Communist China," *Issues and Studies*, April 1986.
- Zhou Rixin, "Advanced Fighters Designed by China; From F8 to F8-II," *Hangkong Zhishi (Aerospace Knowledge)*, October 1988, reprinted in *JPRS-CST-90-002*, 17 January 1990.
- "Zimbabwe to Buy Fighters, Missiles, and Air Defense Radar from China," *International Defense Intelligence*, March 13, 1989.